

LOGISTICS MODERNIZATION IN THE UNITED STATES MARINE CORPS:
MATERIEL DISTRIBUTION CENTER

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE
General Studies

by

KEVIN R. SCOTT, MAJ, USMC

B.S., Chemistry, Jackson State University, Jackson, MS, 1992

M.A., Human Resource Management, Hawaii Pacific University, Honolulu, HI, 1996

M.B.A., Webster University, Beaufort, SC, 1999

Fort Leavenworth, Kansas
2005

Approved for public release; distribution is unlimited.

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 1 - 06-2005		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) Aug 2004 - Jun 2005	
4. TITLE AND SUBTITLE Logistics Modernization in the United States Marine Corps: Materiel Distribution Center				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Major Kevin R. Scott, USMC				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD 1 Reynolds Ave. Ft. Leavenworth, KS 66027-1352				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Military and political savvy professionals understand that logistics contributes to the successful execution of military operations. Publications include numerous cases of logistics failures and more often; logistics failures appear more than logistics successes. Though the dynamics of today's battlefield have evolved from Napoleonic attrition style warfare, responsive and effective logistics remains critical. The United States' unwavering commitment to combat global terrorism required the United States military to envision a lean, agile fighting force supported by an equally lean and agile support force. Transforming the military requires eliminating inefficient processes and adopting best business practices. Modernization of maneuvering forces and logistics allows the United States to impart proportionate lethality in a timely manner. Logistics Modernization (LOGMOD) is paramount so that logistics equips our military forces with the resources necessary to overwhelm our enemies. The United States Marine Corps (USMC) promulgated pioneering LOGMOD initiatives so that units achieved a decisive advantage during military operations. Following the USMC' prominent roles in Operation ENDURING FREEDOM (OEF) and Operation IRAQI FREEDOM (OIF), LOGMOD is becoming institutionalized at all echelons within the USMC. The Materiel Distribution Center (MDC) incorporated modern information technology (IT) and integrated supply and transportation operations under a single process owner to provide impervious logistics support to the warfighter.					
15. SUBJECT TERMS Logistics Modernization, Integrated Logistics Capability, Operational Architecture, Materiel Distribution Center, and Velocity Management					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 91	19a. NAME OF RESPONSIBLE PERSON
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code)

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of Candidate: Major Kevin R. Scott

Thesis Title: Logistics Modernization in the United States Marine Corps: Materiel
Distribution Center

Approved by:

_____, Thesis Committee Chair
Willis F. Jackson Jr, M.P.A., M.S.

_____, Member, Consulting Faculty
James B. Martin, Ph.D.

_____, Member
Michael E. Weaver, M.A.

Accepted this 17th day of June 2005 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

LOGISTICS MODERNIZATION IN THE UNITED STATES MARINE CORPS:
MATERIEL DISTRIBUTION CENTER by Major Kevin R. Scott, USMC, 74 pages.

Military and political savvy professionals understand that logistics contributes to the successful execution of military operations. Publications include numerous cases of logistics failures, and more often, logistics failures appear more than logistics successes. Though the dynamics of today's battlefield have evolved from Napoleonic attrition style warfare, responsive and effective logistics remains critical.

The United States' unwavering commitment to combat global terrorism required the United States military to envision a lean, agile fighting force supported by an equally lean and agile support force. Transforming the military requires eliminating inefficient processes and adopting best business practices. Modernization of maneuvering forces and logistics allows the United States to impart proportionate lethality in a timely manner. Logistics modernization (LOGMOD) is paramount so that logistics equips US military forces with the resources necessary to overwhelm its enemies.

The United States Marine Corps (USMC) promulgated pioneering LOGMOD initiatives so that units achieved a decisive advantage during military operations. Following the USMC's prominent roles in Operation Enduring Freedom and Operation Iraqi Freedom, LOGMOD is becoming institutionalized at all echelons within the USMC.

The Materiel Distribution Center incorporated modern information technology and integrated supply and transportation operations under a single process owner to provide impervious logistics support to the warfighter.

ACKNOWLEDGMENTS

I thank my committee members for the support provided during this educational and challenging venture. Pursuing an advanced degree with a military centric focus was a tremendous honor and memorable accomplishment. I would not have achieved this goal without my thesis committee members.

I extend heart-felt love and sincere appreciation to Glynda, my loving and caring wife, and Karsten, my intelligent and enthusiastic son, for their encouragement and inspiring understanding during my absence.

I thank Dr. Robert Baumann and Mrs. Helen Davis, US Army Command and General Staff College (CGSC), Graduate Degree Programs, for their assistance.

I thank Mr. Dave Drummond, Proctor of A221 Seminar, for his qualitative input regarding historical and future logistical challenges on the battlefield.

I owe special gratitude to the Department of Logistics and Resource Operations instructors and fellow logistics officers for their professional candor, zealous support of LOGMOD, and eagerness to contribute to my thesis.

TABLE OF CONTENTS

	Page
MASTER OF MILITARY ART AND SCIENCE THESIS APPROVAL PAGE	ii
ABSTRACT	iii
ACKNOWLEDGMENTS	iv
ILLUSTRATIONS	vii
ACRONYMS	viii
GLOSSARY	x
CHAPTER 1. INTRODUCTION AND DEFINITION OF PROBLEM	1
Problem Statement	1
Proposed Research Questions	5
Author's Qualification	5
Precedent for Logistics Modernization	7
Research Scope and Limitations	14
Research Objective	15
Importance of Thesis	15
CHAPTER 2. LITERATURE REVIEW	17
CHAPTER 3. RESEARCH METHODOLOGY	25
CHAPTER 4. ANALYSIS AND FINDINGS	29
Integrated Logistics Capability	29
Operational Architecture	32
Velocity Management	34
Commercial Logistics Practices (Dell Computer Corporation)	36
Commercial Logistics Practices (Wal-Mart Stores, Incorporated)	38
Marine Logistics Command	40
Class IX Distribution during Operation Iraqi Freedom	44
Materiel Distribution Center	47
Summary of MDC Interview Questionnaire	53
MDC Operations in Combat	55
CHAPTER 5. CONCLUSION AND RECOMMENDATIONS	58
Answers to Research Questions	59
Recommendations	62
Opportunities for Further Research	63
APPENDIX A. MDC INTERVIEW QUESTIONNAIRE	64

APPENDIX B. DLA’s VISION FOR LOGISTICS EXCELLENCE	68
REFERENCE LIST	69
INITIAL DISTRIBUTION LIST	72
CERTIFICATION FOR MMAS DISTRIBUTION STATEMENT	73

ILLUSTRATIONS

	Page
Figure 1. MDC Interphase with FSSG and TSB	11
Figure 2. USMC Distribution of Personnel by MOS	30
Figure 3. Illustration of the OA Initiative.....	33
Figure 4. The Define-Measure-Improve Methodology	36
Figure 5. Relationship between MLC and Supported Units	46
Figure 6. USMC Logistics Balanced Scorecard.....	51
Figure 7. RFID Technology.	52
Figure 8. Vistars and Iridium Vehicle Tracking System.....	52
Figure 9. Battle Command Sustainment Support System	53
Figure 10. Brief on Use of Intransit Visibility System.....	57

ACRONYMS

CNA	Center of Naval Analysis
CSS	Combat Service Support
CSSE	Combat Service Support Element
C2	Command and Control
DoD	Department of Defense
DPO	Distribution Process Owner
EOM	Echelon of Maintenance
E2E	End to End
FSSG	Force Service Support Group
GCCS-MC	Global Combat Support System-Marine Corps
IT	Information Technology
ILC	Integrated Logistics Capability
ITV	Intransit Visibility
LOC	Line of Communication
LOGMOD	Logistics Modernization
LVS	Logistics Vehicular System
MAGTF	Marine Air Ground Task Force
MCLCAT	Marine Corps Logistics Chain Analysis Team
MEF	Marine Expeditionary Force
MLC	Marine Logistics Command
MDC	Materiel Distribution Center
MTVR	Medium Tactical Vehicle Replacement
MOS	Military Occupational Specialty

OA	Operational Architecture
ODS	Operation Desert Shield and Operation Desert Storm
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OM	Order Management
OST	Order Ship Time
RFID	Radio Frequency Identification
RM	Request Management
RCT	Repair Cycle Time
SECREP	Secondary Reparable
SecDef	Secretary of Defense
TAV	Total Asset Visibility
TMO	Traffic Management Office
TSB	Transportation Support Battalion
US	United States
VM	Velocity Management
USMC	United States Marine Corps
TRANSCOM	Transportation Command

GLOSSARY

Asset Tracking Logistics and Supply System (ATLASS). Primary automated supply and maintenance system used within II MEF.

Assistant Commandant of Marine Corps (ACMC). Second highest ranking officer in the USMC and is responsible for program implementation and analysis of processes and procedures.

Capacity Management (CM). Function of managing, optimizing, prioritizing, and planning resources and capacity to fulfill customer demands.

Center for Naval Analysis (CNA). The CNA is a federally funded research and development center that provides "full-service" research and analysis to assist organizations in becoming more effective and efficient.

Engineering. Engineering provides construction, damage repair, operation, and maintenance of roads and facilities, and logistics enhancements required for commanders in order to sustain military operations.

Combat Service Support (CSS). Essential capabilities, functions, activities, and systematic processes to sustain (arming, fueling, fixing, feeding, and clothing) all elements of operating forces in theater at all levels of war.

Commandant of Marine Corps (CMC). Senior officer in the USMC responsible for providing strategic direction, training personnel, and equipping the USMC.

Current Operations Section (Cops). Section within the FSSG that manages and coordinates operations occurring within a 72-hour timeframe.

Department of Defense (DoD). Executive level governmental agency that exercises command and control over the uniformed military. The Secretary of Defense (SecDef) is responsible to the President of the United States for maintaining an expertly trained and well-equipped military.

Deployed Support Unit (DSU). Arranges for receipt and shipment of materials and supplies to deployed units.

Deputy Commandant, Installation and Logistics (DC I&L). Senior logistician in the USMC responsible for oversight of installations and logistics.

End to End (E2E). Term which defines principle of including and / or analyzing all components of a system, process, or network to determine interrelatedness.

Engineer Support Battalion (ESB). Organization within the FSSG that provides vertical and horizontal construction, power generation and distribution, mobility, counter mobility, survivability, and water purification functions.

Expeditionary Force Development System (EFDS). EFDS improves the previous combat development process with emphasis on involvement by the operating forces, advocates, Marine Forces, and supporting establishment. EFDS allows prioritized responsiveness in meeting the real-time challenges of warfighting, and is consistent with national, joint, and institutional strategy.

Field Ammunition Supply Point (FASP). An area designated to receive, store, and issue Class V materiel; normally located at or near the division, corps, or FSSG area and operated by ammunition skilled personnel.

First Echelon of Maintenance (1st EOM). The user, wearer, or operator of the equipment performs this maintenance. It includes the proper care, use, operation, cleaning, preservation, lubrication, minor adjustment, and parts replacement as prescribed by pertinent publications and tools allowed.

Force Movement Control Center (FMCC). A temporary organization activated by the MAGTF to control and coordinates all deployment support activities.

Force Service Support Group (FSSG). The permanently organized combat service support element of the Marine Expeditionary Force and is charged with providing combat service support beyond the organic capabilities of supported units of the MEF.

Fourth Echelon of Maintenance (EOM). Fourth EOM is performed by units organized as semi-fixed or permanent shops to serve lower echelons within a geographical area. They are the highest maintenance units available in the field, and are well equipped. Their job consists of component/assembly rebuild and repair, diagnosis and isolation of internal piece parts plus their repair, heavy body and frame repair, and jobs that include grinding, pressing, welding, and machining.

Global Combat Support System-Marine Corps (GCSS-MC). GCSS-MC provides the information technology capabilities necessary to execute Marine Air-Ground Task Force (MAGTF) Combat Service Support (CSS) and Supporting Establishment (SE) functions in expeditionary, joint, and combined environments, and those Combatant Command logistical areas addressed in the GCSS Capstone Requirements Document (CRD). GCSS-MC will be developed using Commercial off the Shelf (COTS) business applications suites.

Headquarters and Service Battalion (HQ Bn). Organization within the FSSG that provides command and control functions for the commanding general and his staff.

Health Services. Includes patient movement, primary care, hospitalization, medical logistic, medical laboratory services, blood management, vector control, force health protection service, veterinary services, dental services, preventive health care, and the required command, control and communications.

Intermediate Supply Support Activity (ISSA). The ISSA provides repair parts, combat equipment and packaged food rations to Marine forces on the East Coast and remote locations as far away as the Mediterranean, Afghanistan, Kuwait, and Iraq. The ISSA serves as the intermediary between supported units, DLA, and commercial sources of supply.

Intransit Visibility (ITV). Complete visibility of logistics processes, functions, and services across the full spectrum of military operations.

Landing Force Support Party (LFSP). The LFSP is formed and equipped to facilitate the landing and movement of personnel, supplies, and equipment across the beach, into HLZ or through a port; to evacuate casualties and EPWs; and to perform the beaching, retraction, and salvage of landing ships and crafts. The LFSP also must provide personnel and equipment to support the landing of airborne, air assault or helicopter borne forces, equipment, and supplies.

Lines of Communication (LOCs). Routes, land, water, or air, which connect military forces with their base of operations and along which supplies, equipment, and military forces travel.

Logistics. The professional art and science of planning and carrying out the movement and maintenance of military forces. Logistics provides the resources of combat power, positions those resources on the battlefield, and sustains them throughout the execution of operations.

Logistics Automated Information Systems (LOGAIS). A family of software programs used to track people, supplies, and equipment during MAGTF deployment and redeployment operations.

Logistics Campaign Plan. Provides a roadmap for executing LOGMOD in the USMC, with emphasis on operational level logistics. Logistics Campaign Plan focuses on improving lifecycle management process from concept inception to equipment retirement, reducing demand on distribution system to lessen impact due to diminished transportation resources, and developing a robust and effective command and control capability to support Operational Maneuver From the Sea.

Logistics Movement Control Center (LMCC). The MEF commander's movement control agency. The LMCC is activated on order by Commanding General, FSSG, and reports directly to the FMCC.

Logistics Support Activity (LSA). Geographic area that is located away from enemy's direct and indirect weapon capabilities. The LSA is a secure staging area where

logistics is assembled to support the warfighter through all phases of the military operation.

Logistics Vehicular System (LVS). Heavy, tactical wheeled vehicle used by USMC to conduct long haul ground transportation, distribution, and vehicle recovery operations. The 2d Transportation Support Battalion, Marine Logistics Command extensively employed the LVS to provide battlefield sustainment to I MEF during OIF.

Maintenance Battalion (Maint Bn). Organization within the FSSG that provides first, second, and third EOM functions. Maintenance is performed by commodity professional and maintenance extends the service life of military equipment via preventive and corrective measures.

Marine Air Ground Task Force (MAGTF). The MAGTF is the USMC principal organizational for conducting missions across the spectrum of military operations. MAGTFs provide combatant commanders or joint task force commanders with scalable, versatile expeditionary forces able to respond to a broad range of crisis and conflict situations. MAGTFs consist of a Command Element (CE), Ground Combat Element (GCE), Aviation Command Element (ACE), and a Combat Service Support Element (CSSE).

MAGTF Deployment Support System (MDSS II). Assists in deployment planning and execution and unit movement at the MEF level and below.

Marine Corps Logistics Chain Analysis Team (MCLCAT). Organization whose charter is to evaluate the effectiveness and efficiency of logistics processes and systems. Military personnel are carefully screened for assignment to MCLCAT and have service backgrounds in logistics.

Marine Corps Logistics Education Program (MCLEP). Academic partnership between the USMC and Pennsylvania State University. Senior enlisted personnel and mid-grade officers attend a two-week academic course that focuses on logistics principles and applications.

Marine Expeditionary Force (MEF). The MEF is the principal warfighting MAGTF in the active force structure of the USMC and is normally built around a Division/Wing/FSSG team. The MEF was formerly called Marine Amphibious Force (MAF). The nomenclature was changed because senior Marine leaders felt the term "expeditionary" implied a mission, while "amphibious" was simply a transportation method. There are presently three active MEFs which source the CE's, GCE's, ACE's, and CSSE's of other MAGTF's (i.e., SPMAGTF, MEU, and MEB).

Marine Logistics Command (MLC). Organization designed to provide operational level logistics support in a theater as a bridge between strategic and tactical logistics. MLC concept gained focus in the USMC following Operation Desert Shield /

Operation Desert Storm as a means to enhance logistics support to the tactical level forces by shortening sustainment LOCs.

Maritime Prepositioning Squadron (MPSRON). An assembly of three to five ships strategically positioned around the world to support military operations. These ships carry afloat prepositioned cargo for U.S. military services. The squadron's mission is to provide command and control to facilitate sea transportation of vital equipment and supplies to a designated area of operations.

Materiel Distribution Center (MDC). Organization established within Supply Battalion, 2d FSSG to improve logistics support by integrating supply and transportation functions to execute Materiel distribution and provide in-transit visibility on the battlefield. MDC gained prominence to correct operational and tactical level logistics shortcomings experienced during OIF.

Medical Battalion (Med Bn). Organization within the FSSG that provides medical support to include primary and resuscitative care.

Medium Tactical Vehicle Replacement (MTVR). State of art, commercially based vehicle used by USMC as replacement for the 5-ton transportation and recovery vehicle. MTVR has an increased payload of 7.1 ton cross country and 15 tons on hard surface roads.

Military Occupational Specialty (MOS). A numeric designator that identifies a service member's duties and responsibilities MOS's are categorized based upon military function.

Military Police Battalion (MP Bn). Organization within the FSSG that provide riot control, route security, traffic management, force protection, and personnel security functions.

Non-Secure Internet Protocol Router Net (NIPRNET). The NIPRNET is a network of Internet protocol routers owned by the DoD. Created by the Defense Information Systems Agency (DISA), NIPRNET is used to exchange unclassified but sensitive information between internal users.

Operational Architecture (OA). A description of the tasks and activities, operational elements, and information flows required to accomplish or support a military operation. Key components of OA are Request Management (RM), Order Management (OM), and Capacity Management (CM).

Operational Logistics. Links tactical requirements to strategic capabilities in order to accomplish operational goals and objectives. Includes the support required to sustain campaigns and major operations.

Order Management (OM). Function of routing, coordinating, tasking, and tracking customer orders through to fulfillment. OM is a key component of the USMC Operational Architecture.

Order Ship Time (OST). Amount of time required for a replacement item to arrive at the requested unit. OST is a common benchmark to identify nonvalue added processes in the supply chain.

Radio Frequency Identification (RFID). RFID is a generic term for technologies that use radio waves to automatically identify people and objects. There are several methods of identification, but the most common is to store a serial number that identifies a person or object on a microchip that is attached to an antenna. The chip and the antenna together are called an RFID transponder or an RFID tag. The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it. RFID technology is a key component of USMC initiative to achieve ITV. Active RFID and Passive RFID are fundamentally different technologies. While both use radio frequency energy to communicate between a tag and a reader, the method of powering the tags is different. Active RFID uses an internal power source (battery) within the tag to continuously power the tag and its RF communication circuitry, whereas Passive RFID relies on RF energy transferred from the reader to the tag to power the tag.

Repair Cycle Time (RCT). Amount of time required for a reparable item to be restored to an operable condition.

Request Management (RM). Function of generating and approving customer demands. RM is a key element of the USMC Operational Architecture and the RM function is resident in the supported unit.

SASSY Management Unit (SMU). Wholesale supply agency that processes requests for supply sustainment and maintains an inventory to meet recurring sustainment demands.

Secondary Reparables (SECREP). Assemblies and subassemblies of major weapon systems. Engines, transmissions, starters, and radio receivers are examples of SECREPs and SECREPs are repaired at maintenance facilities to offset replacement costs.

Second Echelon of Maintenance (2nd EOM). This type of maintenance is performed by specially trained personnel (Mechanics) in the organization. Appropriate publications authorize second echelon maintenance, additional tools and necessary parts, supplies, etc. Tools are generally restricted to hand tools that are commonly found in a mechanic's toolbox. Most of the work consists of preventive

maintenance services, adjustments, tightening, equipment inspections, and replacement of easily accessible components and assemblies.

Secret Internet Protocol Router Network (SIPRNET). The SIPRNET is an interconnected network owned and used by the DOD to exchange classified information in a totally secure environment.

Source of Supply (SOS). DoD or civilian agency responsible for wholesale availability of supplies and materials. The Defense Logistics Agency is the DoD's principal wholesale supplier of military equipment and supplies.

Storage, Retrieval, Automated, Tracking, Integrated System (STRATIS). STRATIS is a warehouse management system (WMS) that manages warehouse operations through integration of dedicated localized computer hardware, radio frequency communications, automatic identification equipment and the application software.

Strategic Logistics. Supports organizing, training and equipping the forces that are needed to further national interests. Links the national economic bases (people, resources, and industry) to military operations. The combination of strategic resources and distribution processes represents our total national capabilities.

Supply Battalion (Sup Bn). Organization within the FSSG that performs requisition, inventory management, disposal, records keeping, ammunition control, and warehousing functions.

Supported Activities Supply System (SASSY). Principal supply and maintenance accounting system used by units assigned to I MEF.

Supply. Procurement, distribution, maintenance while in storage, and salvage of supplies, including the determination of kind and quantity of supplies. The ten classes of supply are: Class I. Subsistence. Includes rations and gratuitous health and welfare items; Class II. Minor End items. Includes clothing, individual equipment, tentage, organizational tool sets and tool kits, hand tools, and administrative supplies and equipment. Class III. Petroleum, oils, and lubricants. Includes petroleum fuels, lubricants, hydraulic and insulating oils, preservatives, liquid and compressed gases, bulk chemical products, coolants, de-icing and antifreeze compounds, and coal; Class IV. Construction. Includes construction Materiel, installed equipment, and fortification or barrier Materiel; Class V. Ammunition. Includes chemical, biological, radiological, special weapons, bombs, explosives, mines, fuzes, detonators, pyrotechnics, missiles, rockets, and propellants; Class VI. Personal demand items and nonmilitary sales items. Includes personal grooming, hygienic sanitary items, and sundry packs; Class VII. Major end items. Includes the final combination of end products assembled and configured in their intended form and ready for use (e.g., tanks, howitzers, vehicles, rocket launchers, and mobile machine shops); Class VIII. Medical materiel and supplies. Includes medical unique repair parts, medications, and medical storage components; Class

IX. Repair parts. Includes components and kits, assemblies, and subassemblies required for maintenance support of end items; and Class X. Nonmilitary Materiel. Includes materiel to support nonmilitary programs (e.g., agriculture and economic development), that is not listed in Classes I - IX.

Tactical Logistics. Includes organic unit capabilities and the CSS activities necessary to support military operations. Its focus is to support the commander's intent and concept of operations while maximizing the commander's flexibility and freedom of action.

Theater Distribution Center (TDC). Theater level agency that receives, inventories, stores, and categorizes incoming materials and supplies by service component.

Third Echelon of Maintenance (3d EOM). Special units in support of one or more using organizations perform this maintenance. It consists of diagnosis and fault isolation, repair of equipment using piece parts, assemblies, and components, performing light body repairs, and utilizing contact teams to perform or assist in performing on-site diagnosis/repair. Third echelon is authorized a greater selection of tools than 2nd echelon plus test and diagnostic equipment to accomplish their maintenance mission.

Total Asset Visibility (TAV). Visibility and situational awareness of an organization's assets regardless of location and time.

Traffic Management Office (TMO). Coordinates receipt, storage, transport and distribution of equipment, supplies, and personnel.

Transportation. Military or commercial movement from one location to another by means of railways, highways, waterways, pipelines, oceans, and airways upon completion of the mission or as otherwise directed.

Transportation Coordinator's Automated Information for Movement System (TC-AIMS). Provides automated support for motor transport, control, planning of support, and coordination of overland movement and convoys. Manages use and movement of day-to-day motor transport and heavy equipment.

Transportation Support Battalion (TSB). Performs transportation and distribution functions within the FSSG.

United States Transportation Command (USTRANSCOM). Functional, joint command that provides air, land, and sea transportation for the DoD in times of peace and war. USTRANSCOM is located at Scott Air Force Base, Illinois and serves as the DoD's Distribution Process Owner.

CHAPTER 1

INTRODUCTION AND DEFINITION OF PROBLEM

This is not going to be easy. Some people will have to give up old friends. (2001, 1)

LtGen Gary McKissock, USMC (Retired), Former
Deputy Commandant for Installations and Logistics

Military professionals define logistics as the art and science of planning and carrying out the movement and maintenance of forces. Logistics encompasses the resources of combat power, positions these resources in garrison and on the battlefield, and sustains military forces throughout all phases of strategic, operational, and tactical level operations. This chapter provided an overview of the importance of logistics, logistics modernization (LOGMOD), and introduced the Materiel Distribution Center (MDC) as an initiative to positively enhance LOGMOD. One quickly recognizes how logistics enhances the success of military forces; therefore, efforts aimed at improving logistical shortcomings are worthy of extensive research and analysis.

Problem Statement

We cannot be satisfied with status quo, and must take the lessons learned here and have the courage to change the processes, command and control, industrial base, velocity, transportation and the way we think about things to obtain better information, information, information. (2004, 3)

Brigadier General M. Lehnert, Former Commanding
General, Marine Logistics Command and 2d FSSG

Modernizing Combat Service Support (CSS), LOGMOD, provided a tremendous opportunity to address the systematic and institutional challenges faced within the USMC. The Combat Service Support Element (CSSE) of the Marine Air Ground Task

(MAGTF) did not optimize logistics support due to archaic, nonvalue added processes and systems, inadequate focused training and development for logistics personnel, and the lack of an integrating information technology (IT) enabler. After-action reports from Operation Desert Storm (ODS), Operation Enduring Freedom (OEF), and Operation Iraqi Freedom (OIF) identified compelling shortcomings in logistics. These shortcomings included excessive quantities of unaccounted for supplies and equipment; lack of system interoperability amongst strategic, operational, and tactical logistics units; a poorly managed theater distribution center (TDC); erroneously marked containers; and extended delays in order ship time (OST) for supported units to receive battlefield sustainment.

The battlefield success enjoyed by Alexander the Great and the Macedonian Army was achieved principally by focused and responsive logistics. Alexander's Army reigned as the premier fighting force in Europe and Asia. An average of ten to fifteen days of sustainment was embedded within the Army, and sustainment was strategically positioned along the Army's axis of advance. Alexander relied heavily on the local population to secure and replenish supply and water depots that enabled the Army to achieve speed and maintain operational tempo. "Because of the restricted capabilities of the methods of land transportation available to Alexander, only a limited amount of supplies could be carried from one district to the next, Alexander would have to arrange the collection of provisions in advance all through his campaigns" (Engels 1980, 41). The Macedonian Army's understanding of the criticality of logistics dictated which territories Alexander's forces would enter. Alexander possessed an impeccable mastery of the capabilities of his logistics system and its impact on strategy, tactics, consumption rates, and conduct of marches.

General Hagee, Commandant of the USMC (CMC); Lieutenant General Kelly, Deputy Commandant, Installation and Logistics (DC I & L); and senior USMC leaders embraced LOGMOD and stressed the importance of implementing LOGMOD, so that the USMC complied with the Department of Defense's (DoD's) goal of a responsive, agile, and lethal military force. Senior military leaders realized that LOGMOD demanded a cultural and institutional understanding that viewed change as an opportunity versus a threat. Their leadership was pivotal to cultivating that mindset within the USMC. In response to senior leadership's call for modernization, military and civilian personnel aboard Marine Corps Base, Camp Lejeune, North Carolina, developed an MDC to integrate supply and transportation operations to improve logistics support.

In an unprecedented, but much-needed top-down supportive fashion, General Hagee published All Marine (ALMAR) Message Number 006/04 on 2 February 2004 to identify logistics shortcomings, educate Marines on LOGMOD initiatives, solicit support from commanders in engaging LOGMOD, and most important, stress his total commitment to implementation of LOGMOD through the Expeditionary Force Development System (EFDS). The EFDS architecture evaluates LOGMOD initiatives and serves as the baseline for current and future LOGMOD initiatives. ALMAR 006/04 articulated the importance of improving logistics effectiveness as an essential element in maximizing the lethality of the MAGTF and enabling both expeditionary maneuver warfare and seabasing capabilities of persistence, sustainment, and reconstitution at sea.

General Hagee addressed the need to transform the USMC 30 year old mainframe-based supply and maintenance systems, nonvalue added logistics processes, significant communications shortfalls, lack of TAV and ITV, and a challenged and disjointed distribution system that is unable to support maneuver

on today's battlefield as critical justifications to modernize logistics.(ALMAR 006/04 2004, 1)

General Hagee elevated the urgency of LOGMOD to a level comparable to fielding of major weapons systems such as the MV-22 Osprey, Joint Strike Fighter, and the Expeditionary Fighting Vehicle.

Lieutenant General Kelly, senior logistician in the USMC, published a stage-setting article titled, "LOGMOD: A Marine Corps Warfighting Imperative," in the August 2004 edition of the *Marine Corps Gazette*. The article highlighted the requirements for changing how USMC forces were supported logistically and mandated moving beyond the 1950's supply support mentality. Lieutenant General Kelly asked commanders at all levels to be fully engaged in LOGMOD so that the USMC supported Expeditionary Maneuver Warfare and Sea Basing in 2015. "Technologically speaking, the Global Combat Support System-Marine Corps (GCSS-MC) became an official program of record in 2003 and was designated a Category I program along with the Expeditionary Fighting Vehicle" (Kelly 2004, 16).

GCSS-MC is an IT enabler developed under the auspices of Marine Corps Systems Command (MARCORSYSCOM). GCSS-MC is the USMC portion of the overarching Global Combat Support System family of systems, as designated by the Joint Requirements Oversight Council and the GCSS General Officer Steering Committee. GCSS-MC is expected to enhance LOGMOD by providing the MAGTF with a modern, deployable IT tool for supported and supporting units. GCSS-MC is based upon a Logistics Operational Architecture that integrated current supply, logistics, distribution, and financial processes. GCSS-MC is scheduled for initial fielding during 2006. Further, GCSS-MC featured a logistics C2 capability that injected logistics data into the MAGTF

Common Operational Picture. Presently, MAGTFs rely on disparate manual and legacy processes to plan and conduct logistics related tasks which create inefficiencies and inconsistencies as evidenced during ODS and OIF.

Proposed Research Questions

1. Will integrating the traditional logistics functions of supply and transportation, under the auspices of the MDC, provide responsive, effective, and efficient logistics support to the warfighter in both garrison and battlefield settings?
2. Is the Supply Battalion within the Force Service Support Group (FSSG) the appropriate agency to exercise C2 of the MDC?
3. What types of changes are required for doctrine, personnel, and systems to operate the MDC?
4. Does the MDC operational model support US Transportation Command (USTRANSCOM) assignment as the DoD's single process owner for E2E distribution?

Author's Qualification

The author's Military Occupational Specialty (MOS) is Ground Supply, 3002, a functional component of logistics. The author completed the USMC Ground Supply Officers Course in 1993 and served in company and regimental supply officer billets. Serving with 3d Marines (Reinforced), 3d Marine Division from 1994-1997, the author was responsible for coordinating supply support for more than 3,500 Marines. The 3d Marines Reinforced Regiment used the Marine Corps Supply System to requisition Class II (tents and tool kits), Class VII items (vehicles and weapons), and Class IX repair parts to support garrison and deployed operations. During this time, supply support reflected a

pull-type methodology and relied extensively on an adjacent Combat Service Support Element (CSSE) to provide supply support above the capabilities of 3d Marines Reinforced Regiment. The CSSE stockage and inventory levels were based upon unit consumption rates.

The author served as Supply Officer and Current Operations Officers, 2d FSSG and assisted in implementing the Integrated Logistics Capability (ILC) and Operational Architecture (OA) initiatives. These two LOGMOD initiatives sought to improve logistics support by introducing a process-oriented approach. Detailed information on the operating principles of ILC and OA appears in chapter 4.

The author served as Current Operations Officer, Marine Logistics Command (MLC), Kuwait, United States Marine Forces Central Command, during OIF. The MLC provided operational-level logistics support to I MEF. Operational level logistics support bridges the gap between strategic-level logistics and lessen the logistics requirements on the tactical level units. I MEF and V Corps were strategically arranged on the battlefield and tasked to conduct simultaneous tactical-level attacks against Iraqi forces to remove Saddam Hussein's dictatorial regime and liberate the Iraqi populace.

Serving as Current Operations Officer, the author witnessed the negative effects produced by unresponsive and nonintegrated logistics support. Upon returning from OIF, the author participated in several forums and action groups that focused on LOGMOD and improving logistics C2.

The author attended the Marine Corps Logistics Education Program (MCLEP) at Pennsylvania State University. The curriculum addressed military and commercial logistics and provided instruction on supply chain management, inventory management,

customer service, logistics and IT, transportation and distribution operations, warehouse management, order management, global logistics, DoD logistics, and change management. The author gained an appreciation for the unlimited improvements a logistics organization could achieve upon tailoring operations to ensure total customer satisfaction, defining processes and procedures to optimize service and performance, and leveraging IT capabilities to enable processes.

Precedent for Logistics Modernization

In July 1996, the *Defense Science Task Force Report on LOGMOD*, published by the Office of the Under Secretary of Defense for Acquisition and Technology, listed four compelling reasons to justify LOGMOD.

These four reasons were DoD needed funds to pay for future recapitalization; DoD needed to find high- payoff opportunities for cost savings, while maintaining readiness; DoD needed to improve the accuracy and timeliness of logistics information; and DoD spent approximately \$66 billion per year on weapon systems Operation and Support (O&S) costs. (*Defense Science Task Force Report on LOGMOD* 1996, 2)

Presently, the DoD faces a substantial bill to replace aging equipment. By identifying high payoff opportunities to reduce operating and support costs, recapitalization can be less burdensome. Effective provision of logistics information is paramount to improving the effectiveness and efficiency of logistics support. Weapons systems O&S costs consume a substantial part of the defense budget and include operations and maintenance (O&M) expenditures, as well as expenditures involved in the operation and support of the services' weapons systems. While it is paramount to support existing weapons systems, it is important to identify efficient ways to accomplish this task.

LOGMOD should improve the visibility of battlefield resources. With introduction of GCSS-MC, the warfighter will be able to place a request for services, trace the status of that request, and know how and when the item or service will be delivered. Effective intransit visibility (ITV) eliminated placing repetitive requisitions for logistics services and promoted confidence in the system's supportability. One of the major issues that surfaced during OIF was the timely delivery of the requested sustainment to units covering the last tactical mile, even though ample sustainment was present in the theater.

LOGMOD is aimed at improving the Marine Air Ground Task Force (MAGTF) effectiveness by modernizing logistics processes and systems to improve the way critical battlefield resources are maintained, managed, and delivered to the warfighter (Neal 2004, 21).

Achieving this task is expected to result in accurate and timely visibility of MAGTF resources, enhance the ability to realign logistics capabilities in accordance with MAGTF commander's priorities, and increase the MAGTF's combat power.

LOGMOD can be defined using two examples: (1) USMC managed inventories of routine items, such as oil filters, the same way it manages critical items, such as amphibian assault vehicle (AAV) sights. A key aspect of LOGMOD focused on establishing different supply chains for different types of inventory, based upon on the uniqueness and values of the item. High-value items with few sources of supply that are critical to supporting the warfighter should be managed differently from low-value items (office supplies) with multiple sources of supply. Consequently, low-value items with few or restricted sources of supply (military computers) will be managed differently from

high-value items with many sources and large market capacity (pharmaceutical supplies). Basically, high-value items will be a priority for capital expenditures and storage space within organizations. (2) LOGMOD entailed changing USMC current logistics processes to improve warfighter effectiveness on the battlefield. Organizations achieve this task by realigning traditional supply functions and synchronizing distribution functions, so that supply and transportation are integrated at the wholesale level. By integrating supply and distribution functions at the wholesale level, warfighting units can focus on core competencies instead of supply functions, such as storage and inventory management. LOGMOD focuses supply support on enhancing the MAGTF's capabilities. The author researched LOGMOD by focusing on four research questions and provides these introductory comments:

1. Will integrating the traditional logistics functions of supply and transportation under the auspices of the MDC provide responsive and effective logistics support to the warfighter in both garrison and battlefield settings?

Personnel learned several key logistics lessons during OIF. These lessons included a requirement to integrate supply and transportation operations, so units would know the location of sustainment; the lack of system interoperability between the tactical, operational, and strategic levels affected timely requisition and delivery of sustainment to the tactical units and resulted in redundant layers in coordinating and executing battlefield distribution; the lack of traffic management office (TMO) expertise contributed to aged freight and airway bills, interest cost from contracts that were not closed properly, transportation discrepancy reports were not completed, and distribution planning was not completed. Further, battlefield distribution planning factors were not

computed because distribution planning and execution processes were not well coordinated. Total asset visibility (TAV) and ITV were poor, and the absence of these capabilities did not allow for distribution integration under a single command or process owner.

The MDC began operations during September 2004 to correct the aforementioned logistics support shortcomings. The MDC concept reflected the Logistics Campaign Plan which articulated these characteristics: organized so that the commander in the field can be absolutely confident that required support will be provided when and where needed; maintained warfighting focus that was consistent with expeditionary maneuver warfare and joint concepts; operated in peacetime and during war; emphasized speed and information to replace mass; and implemented methodology to move from the source of supply through theater distribution.

During OIF, elements of the 2d FSSG organized into the MLC to provide operational level-logistics support to I MEF during OIF. MLC operations were a precursor to establishment of the MDC. I MEF served as the tactical level ground maneuvering element and conducted a simultaneous corps level attack with V Corps. The MLC model originated following ODS in 1991. The MLC provided operational logistics support to I MEF so that I MEF's tactical level logistics unit could have a limited logistical footprint. MLC successes and failures during OIF appear in chapter 4.

2. Is the Supply Battalion within the FSSG the appropriate agency to exercise C2 of the MDC?

Establishing the MDC in September 2004 was an aggressive initiative to address logistics support shortcomings identified during ODS and OIF. Major General Dickerson,

Commanding General, Marine Corps Base, Camp Lejeune, North Carolina, and Brigadier General Coleman, Commanding General, 2d FSSG, offered compelling rationale for positioning the initial MDC under the tutelage of Supply Battalion.

Positioning the MDC within Supply Battalion was supported with these arguments: Supply Battalion's inventory was described as distribution moving at the speed of zero; Supply Battalion focused on E2E distribution and is responsible for procurement to receipt; Supply Battalion provided for coordination of commodity distribution via the Sassy Management Unit (SMU), Rations Platoon (Class I), Direct Support Stock Control (Class II), Medical Logistics Company (Class VIII), Ammunition Company (Class V) and Hazardous Materiel; Supply Battalion allowed the MDC to identify and provide distribution-planning factors to tactical distribution experts within the TSB which allowed TSB personnel to focus on tactical distribution; and Supply Battalion allowed MDC to interphase between inventory manager and distribution manager. (Dickerson 2004, 11)

MDC served as a single process owner and coordinated distribution with TSB. G-3, FSSG remained engaged throughout the process and established priorities to ensure resource optimization. Figure 1 illustrates the linear relationship between Supply Battalion, MDC, TSB, FSSG G-3, and FMCC.

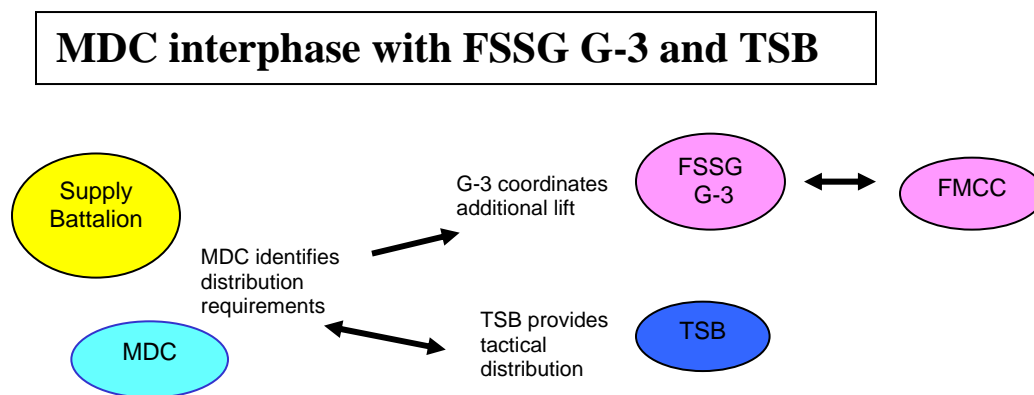


Figure 1. MDC Interphase with FSSG and TSB
Source: Dickerson 2004, 6.

3. What doctrine, personnel, or system changes are required to operate the MDC?

Marine Corps Warfighting Publication (MCWP) 4-1, *Logistics Operations*; MCWP, 4-11.3, *Transportation Operations*; and MCWP 4-11.7, *MAGTF Supply Operations*, provided comprehensive doctrine governing execution of their respective functions. USMC officer and enlisted personnel were assigned to delineated logistics (04XX), supply (30XX), and transportation (35XX) MOS. Personnel attended formal schools prior to assignment to the operating forces. Each discipline used distinct and noninteroperable IT, and as evidenced during OIF, disparate IT led to inefficiencies when providing CSS to the maneuvering units.

4. Does the MDC operational model support US Transportation Command (USTRANSCOM) initiatives as the DoD's single process owner for E23 distribution?

In September 2003, Secretary of Defense Rumsfeld appointed USTRANSCOM as the DoD's Distribution Process Owner (DPO). As the DPO, USTRANSCOM directed, supervised, coordinated, synchronized, and developed processes, doctrine, business rules, IT tools, systems, and procedures to ensure effective and efficient logistics support. More importantly, the warfighter gained confidence in the reliability of the distribution and sustainment system.

“Mathematically, distribution could be expressed as the sum of transportation and supply producing formula, $\text{DISTRIBUTION} = \text{TRANSPORTATION} + \text{SUPPLY}$ ” (Ross 2003, 1). This linear relationship argued that transportation and supply were independent and without an integrating agent, optimal logistics support would not be provided to the warfighter.

USTRANSCOM was traditionally responsible for the transportation part of the equation above. A combination of military and civilian agencies within the DoD performed the supply element of the equation. Several agencies and commands within the DoD (i.e., Defense Logistics Agency, Army Materiel Command, and Marine Corps Logistics Base, Albany, Georgia) and services procure and store equipment and supplies to meet sustainment requirements. USTRANSCOM's designation as the DPO neither changes procurement and storage nor changes the organizational chain of command.

What has changed is the fact that the DoD now has a combatant command singularly accountable for the distribution process. No single agency or command has ever been responsible or accountable for making DoD's distribution system work for the warfighter (Ross 2003, 1).

Prior to designating USTRANCOM as DPO, DoD's distribution system was fragmented and consisted of stove-piped processes that eroded confidence in logistics processes and systems.

Well-intended initiatives on the part of innovative service members often resulted in service tailored; stove-piped products that degrade existing systems by placing greater demands on the system, create throughput dilemmas at ports, and promote problems with achieving TAV from factory to foxhole. Appointment of an established DPO led to interoperable systems and doctrine that enhanced the level of logistics support provided to the warfighter.

At USTRANSCOM, teams are exploring opportunities to integrate functions and services amongst DoD agencies, commercial partners, and combatant commanders by identifying seams, learning from academic and industry leaders in supply chain management, and soliciting ideas from partners in DoD's distribution system. (Ross 2003, 2)

USTRANSCOM's overarching task is to meld experience and knowledge to improve service to the warfighter by incorporating effective supply chain management solutions. Stated in layman's terms, military personnel should be able to order items and have them delivered with the same level of confidence a consumer has when ordering or patronizing major commercial entities like Wal-Mart Stores, Incorporated and Dell Computer Corporation.

Research Scope and Limitations

Logistics includes all branches of the military and each service relies on streamlined and effective logistics to accomplish its mission. Logistics is a complex and expansive subject that spans the strategic, operational, and tactical levels of war. Components of tactical logistics are supply, transportation, maintenance, engineering, health services, and services; operational logistics includes forces closure, arrival and assembly, intratheater lift, theater distribution, sustainment, reconstitution and redeployment; and strategic logistics includes procurement, mobilization, war reserves, materiel readiness, deployment and support, force regeneration, mobilization, and facilities. To keep the research focused and relevant to the current operational environment, the author confined the preponderance of the information on USMC operations and initiatives aimed at LOGMOD. MDC began operations during September 2004; therefore, the availability quantifiable data on MDC operations was limited.

The author provided an interview questionnaire to four individuals who were involved in establishing the MDC. Due to military obligations and personal reasons, three of the four intended interviewees did not complete the interview questionnaire.

Research Objective

Conducting an exhaustive analysis of LOGMOD was an excellent opportunity to identify shortcomings in processes, procedures, and organizational operating models in order to enhance logistics support. The USMC is the smallest branch of service with the smallest force structure and operating budget; therefore, prudent LOGMOD has tremendous opportunities to enhance support to the warfighter and is cost effective in both personnel savings and equipment sustainment costs. The research was conducted to determine the effectiveness of the MDC initiative. Comparing the business practices and management of their supply chains proved informative in analyzing the credence of LOGMOD because there are numerous similarities between military and commercial logistics.

During OIF, all branches of the military faced mission impeding challenges as a result of nonresponsive logistics support. The author identified plausible recommendations to support MDC operations, future USMC LOGMOD efforts, and developed a research baseline for future use by the other branches of the US Armed Forces.

To validate the research, the author relied on historical analysis of effective and ineffective logistics operations incorporating results from comprehensive assessments conducted by the Center of Naval Analysis (CNA) and Marine Corps Logistics Chain Analysis Team (MCLAT).

Importance of Thesis

The United States of America remains committed to prosecuting the Global War on Terror and will likely participate in ongoing military operations spanning the globe.

Logistics plays a pivotal role in supporting the forces that prosecute military operations so that peace, democracy, and stability prevail worldwide. Scholarly personnel must never be pleased with existing processes and must change at a rate equivalent to the external environment or risk becoming extinct.

Logistics organizations must analyze and optimize processes and procedures to provide impeccable and responsive support. The US military establishment is dutifully supported by citizens' taxes, and excesses and inefficiencies in logistics are costly and unacceptable. This research project illustrated the urgency for revamping doctrine, personnel structure, and IT support requirement to educate personnel on the benefits of LOGMOD.

The author selected this research project to broaden his mastery of logistics and to gain knowledge of DoD improvement initiatives that are aimed at improving the US military.

The cornerstone of the research revolved around the MDC's design and operational prowess. The research indicated that the MDC has the potential to enhance logistics support within the USMC. The author supported expanding the MDC operational model to the two other active duty MEFs within the USMC.

LOGMOD could benefit other branches of service, specifically, the US Army because the US Army and the USMC conduct ground combat operations. Ground combat operations are sometimes large and bulky, and these military operations tax the organization's logistics support capabilities.

CHAPTER 2

LITERATURE REVIEW

A real knowledge of supply and movement factors must be the basis of every leader's plan: only then can he know how and when to take risk with those factors, and battles are won by taking risks.

Napoleon

The scope of literature on military and commercial logistics was expansive, and scholars continue to publish innovative measures to promote reliable, cost-effective, and comprehensive logistics support. Several publications and articles that address the DoD's commitment to foster improved logistics support were available. The cornerstone of publications on DOD LOGMOD focused on better performance at a lower cost.

According to remarks by Honorable Jacques Gansler, Under Secretary of Defense, Acquisition and Technology, at the US Army War College in 1998, "The DoD required dramatic transformation to reduce costs, reduce personnel, and to promote enhanced performance in areas of readiness, responsiveness, and sustainment" (1998, 2).

At the DoD level, there was emphasis on contrasting commercial logistics success with military shortcomings in areas related to inventory management, IT, supply chain analysis, and global transportation. Inventory management sought to eliminate excessive quantities of materials and supplies and instead maintain streamlined inventories based upon past and forecasted consumption rates. Supply chain analysis focused on studying all nodes and participants in the supply chain to identify bottlenecks. DoD was convinced the military could enhance operations by investing in modern IT to provide real-time information on the location of repair parts in the supply chain and assist in designing weapon systems with embedded intelligent diagnostic capabilities. Global transportation

focused on optimal use of worldwide communication and transportation assets and capabilities to meet military needs in developed and austere environments.

USMC doctrinal publications provided a comprehensive overview of the tenants of strategic, operational, and tactical logistics. These publications provided a systematic overview of the key components of logistics, which are supply, maintenance, transportation, health services, engineering, medical, and other services to include postal, personnel management, graves registration, finance, and disbursing. The author reviewed USMC doctrinal and warfighting publications on logistics and focused heavily on supply and transportation. Within the USMC, supply and transportation are distinct disciplines with designated MOS and career progressions paths for select enlisted, warrant, and commissioned personnel.

Marine Corps Warfighting Publication (MCWP) 4-11.7, *MAGTF Supply Operations*, provided a detailed overview of current supply operations and clarified how the principles of logistics, which are responsiveness, simplicity, flexibility, economy, attainability, sustainability, and survivability; must be considered when introducing a Logistics Modernization initiative.

Responsiveness is ensuring the right support in the right quantity in the right place at the right time. Simplicity can be described as avoiding complexity. Logistics systems should be comprehensive to meet the supported commander's needs, but user-friendly to operate and manage. Flexibility entailed adaptability to multiple or changing battlefield situations. Economy included using the fewest and cost-effective resources to achieve the objective. Attainability guaranteed the availability of means to equip military forces. Sustainability described a well designed logistics system capable of supporting military

operations for extended times. Survivability included force protection and hardening to ensure support is available during perilous times.

MAGTF Supply Operations provided a comprehensive overview of USMC Supply Programs, USMC Supply System, sources of supply, planning for supply operations, organization of the CSSE for supply operations, and MAGTF II/LOGAIS.

USMC supply programs included war reserve materiel and a reparable issue point (RIP). War reserve materiel is safeguarded and structured to provide contingency sustainment during deployed and garrison military operations. The RIP included an inventory of components and subassemblies to support major weapons systems.

The USMC Supply System consisted of an integrated command and control network beginning with the Commandant and linked throughout the USMC and the US industrial base. Marine Corps Logistics Bases (MCLBs) at Albany, Georgia, and Barstow, California, are in close proximity to supported FMFs and these MCLBs provided storage and inventory management functions for supplies and equipment.

MCWP 4.11.3, *Transportation Operations*, provided a comprehensive and doctrinal framework of transportation with a focus on the sub functions of transportation. The subfunctions of transportation are motor transport, materiel handling, landing support, embarkation, freight and passenger transportation, aerial delivery, and port and terminal operations.

Key elements presented in *Transportation Operations* include deployment and employment transportation, transportation organizations, transportation command and control, landing support operations, air movement, air delivery operations, port operations, and rail operations.

In *George C. Thorpe's, Pure Logistics* by Stanley Falk, logistics and logistical systems were defined; and logistics was analyzed from a historical perspective with a case study assessment of Napoleon's unsuccessful campaign into Russia, from 1811 through 1812, due to lack of food (Class I) and transportation. The author credited Major General Thorpe, USMC Retired, with pioneering efforts to formalize education in logistics. This literary publication illustrated the relationship between strategic, operational, and tactical logistics by amplifying the importance of the US industrial base to producing goods and services required by the military during peace and war operations. The author contrasted Jomini's (essential) and Clausewitz's (subservient) positions on logistics.

General Krulak (USMC Retired), then Brigadier General and Commanding General, 2d FSSG, credited robust logistics as the decisive factor in allowing the USMC to conduct a two-division breach on the western flank of Kuwait. Tactical employment of motor transportation assets and on-the-move resupply of First and Second Marine Divisions along with the US Army's Tiger Brigade proved decisive in establishing a Combat Support Service Area (CSSA) at Gravel Plain, vicinity of Al Kanjar. The CSSA at Gravel Plain allowed the USMC to position essential sustainment of Classes I, III, IV, V, VIII, and IX to responsively support First and Second Marine Divisions prior to and during their attacks of the Iraqi defensive positions in Kuwait.

General Krulak praised the dedicated and unselfish contributions of the Marines and Sailors in ensuring that the two divisions possessed adequate logistics to support I MEF's attack into Kuwait to dislodge Iraqi forces as of 0001, 20 February 1991 (Martin 1995, 34).

In 1998, the USMC embarked upon an aggressive initiative to improve logistics by partnering with private firms and civilian academic institutions. This initiative became known as the Integrated Logistics Capability (ILC). ILC sought to improve logistics support to the warfighter, particularly supply and maintenance, by revamping information technology, enhancing the intellectual capacity of Marines, identifying nonvalue added process, concentrating logistics functions within logistics specific units, so that the warfighter could concentrate on core competencies and reduce operating costs by reducing inventory.

Key components of the ILC initiative included institutionalization of best practices for acquisition and materiel management, reengineering logistics IT, streamlining IT acquisition, movement of second and third echelon of maintenance (EOM) to intermediate level, movement of secondary reparables (SECREP) and 4th EOM to Materiel Command, movement of selected supply functions from using unit level to intermediate level, institutionalization of the quadrant model, and establishment of strategic academic alliances (i.e., Pennsylvania State University and University of North Carolina).

The Installation and Logistics Branch, Headquarters, USMC, published numerous presentations and publications, which articulated the USMC position on LOGMOD. Common within this literature is the intent of eliminating nonvalue added process and incorporating advances in logistics practices and technologies in order to increase the MAGTF's mission capabilities. Additionally, briefs on LOGMOD contrast cumbersome, layered relationships that stifle approval in the logistics chain with responsive, linear relationship that exploit simple processes, integrated systems, educated personnel, and

investment in supportive IT. Several graphical presentations on LOGMOD appear in chapter 4.

In 2002, 2d FSSG led the OA initiative to streamline logistics processes and allow functional battalions to concentrate on core competencies such as supply, maintenance, transportation, and general engineering. The OA defined and documented future logistics functions, capabilities and procedures, and adopted a logistics chain approach to integrate battlefield command and control. The OA strengthened supporting-supported relationships through RM, OM, and CM.

The Logistics OA provided integrated systems and processes for deployed and garrison environments, a single order manager for CSS requests, an ability to manage capacity at the MAGTF-level, and interoperable systems to ensure DoD compatibility. An illustration of the OA appears in chapter 4.

Mark Wang's *Accelerated Logistics: Streamlining the Army's Supply Chain* introduced velocity management (VM) to improve responsiveness, reliability, and efficiency of the Army's logistics system. The VM initiative was conducted aboard Fort Bragg, NC and focused on reducing massive and cumbersome stockpiles of supplies that stifled the supply chain. The VM study focused on tailoring inventory to meet supported units' needs by restructuring the distribution process. The old view of logistics was replaced with the contemporary business view of logistics as a set of customer-focused processes honed to deliver supplies when and where they are needed. The author identified cost savings opportunities by shipping items to overseas destination via sealift in lieu of air travel. VM used the Define-Measure-Improve methodology to evaluate

Army logistics, and a description and graphic portrayal of this methodology appears in chapter 4.

The 2d FSSG organized into an MLC to provide operational level logistics support to I MEF during OIF. The MLC focused on force closure, sustainment, and reconstitution and regeneration of USMC forces in the battlefield theater. The MLC provided resources to tactical commanders, procured resources not provided by strategic logistics, and managed the resources necessary to sustain all phases of the campaign. Ultimately, the MLC extended the operational reach of USMC forces by shortening the LOCs. Shortening the LOCs allowed the tactical commander to maintain tempo, speed, and momentum on an extended battlefield in lieu of cumbersome tactical logistics.

Key logistics lessons learned by MLC during OIF included: operational logistics doctrine needs refinement, organic FSSG / MLC command and control is insufficient for 21st Century logistics sustainment, ITV of distribution resources and supplies is insufficient – Solution must link supply system with transportation medium, Multiple supply systems were too cumbersome, Lack of an integrated logistics IT enablers, Insufficient bandwidth to supply USMC supply and maintenance operations, Inability to articulate distribution planning factors, Distribution planning and execution processes were not well coordinated, Need to integrate all elements of distribution functions under one command, Initial supply and transportation processes were organized for garrison versus combat support. (Dickerson 2004)

Literature on Wal-Mart Stores, Incorporated, and Dell Computer Corporation substantiated the benefits of streamlining the supply chain, focusing on customer satisfaction, using modern IT, and integrating the distribution system. These Fortune 500 firms gained remarkable market share in competitive commercial environments largely in part to robust logistics and investments in IT.

Wal-Mart epitomized the single process owner theory by coupling distribution and inventory management to meet customer needs. Wal-Mart invested handsomely in IT

in the 1980s, and this investment postured Wal-Mart to track customer spending patterns, tailor on-site inventory, link store sales to its corporate headquarters in Bentonville, Arkansas, and optimize its purchasing capabilities with suppliers.

“Dell Computer Corporation, founded in 1984, ranked as the second largest computer systems producer in the world with daily sales in excess of \$5 million” (Dell Computer Corporation 2005,1).

Dell’s commitment to total customer satisfaction and use of modular designed products improved Dell’s sales. Modular designed products provided added flexibility in procurement and distribution operations because suppliers were linked to the ordering process under Dell’s direct control. Supplies and components moved through the supply chain and arrived when and where needed, and since Dell owned all facets of distribution, originating with the customer’s request and ending with delivery of the finished product; a trustworthy and reliable relationship existed amongst Dell and its customers.

CHAPTER 3

RESEARCH METHODOLOGY

OIF saw the Marines, Sailors, and Soldiers of I MEF fighting over the longest distances in USMC history and at speeds never before traveled. The tremendous combat power of I MEF played an instrumental role in breaking the back of the Iraqi regime and I MEF's logistics backbone made it possible. As the Commanding General of I MEF's 1st FSSG, my biggest challenge was to maintain the agility required to adapt to rapid changes on the battlefield in a ground fight of unprecedented speed. USMC success was a new benchmark in Marine combat operations and logistics, as seen by the USMC ability to travel 450 miles from Kuwait to Tikrit in roughly 21 days.

Statement from BGen E. Usher III, March 2004

This study of logistics provided a great platform to understand the importance of moving, equipping, and maintaining civilian and military organizations. The author's direct participation in, and observation of, efforts aimed at LOGMOD within the USMC were presented in chapter 1 and formed the basis for documenting primary research. These participatory efforts included the Integrated Logistics Capability (ILC), Operational Architecture (OA), and service with the MLC during OIF. The research design incorporated a significant amount of secondary research on DoD logistics, commercial logistics practices, and the MDC operational design.

Comparative and descriptive analysis of various LOGMOD initiatives provided a venue to evaluate initiative. Analysis of the initiatives served as a feedback mechanism to prevent disastrous reoccurrences due to improper integration of people, processes, and IT. Further, the author used comparative analysis to illustrate the applicability of commercial logistics practices, specifically supply chain optimization, inventory management, and

centralized distribution within the US Armed Services by researching business models of Wal-Mart and Dell.

Historical logistical successes and failures of Alexander the Great, Napoleon, and USMC units serving during World War II and ODS reflect the importance of logistics on past battlefields and support the importance of responsive and effective logistics on today's modern battlefield.

A descriptive analysis of the MLC operational model, along with quantitative and statistical analysis of MLC operations during OIF from January 2003 through November 2003, served as a precursor to establishment of the MDC. Specifically, analysis of quantitative data collected by MCLAT on supply and distributions operations appears in chapter 4.

The research design focused heavily on MLC operations because these logistics efforts occurred during combat. Combat operations provided a great opportunity to assess previous LOGMOD initiatives and a means to identify current logistics shortcomings. MLC operational theory appears in chapter 2, and an analysis of MLC operations during OIF appears in chapter 4.

The study included an assessment of the MDC operational design and results of an analysis to determine if personnel were properly trained to perform the tasks. The results of an interview questionnaire completed by First Lieutenant Scott Beatty, MDC's Operations Officer, provided a subjective and qualitative evaluation of the MDC's operational effectiveness.

Information on use of the MDC model by the 2d Marine Logistics Brigade during OIF-III, 2005, provided a realistic means to evaluate the effectiveness of the MDC model during demanding combat operations.

The author assembled and analyzed various amounts of qualitative information on LOGMOD within military and commercial organizations. The grounded theory methodology of data analysis is used to theorize the applicability and effectiveness of the MDC initiative. The grounded theory methodology is a qualitative research approach that was originally developed by Glaser and Straus in the 1960s. The self-defined purpose of grounded theory is to develop applicable theory about phenomena of interest whereby the theory is grounded in observation. Grounded theory is an iterative process. The research begins with raising generative questions to help guide the research.

In terms of analyzing qualitative information related to LOGMOD in the USMC, the constant comparison method allowed the author to compare concepts or categories emerging from the ILC, OA, and VM initiatives and compare these findings with concepts emerging from the MDC initiative. In the constant comparison method, concepts or categories emerging from one state of the data are compared with concepts emerging from the next. The author looked for relationships between these concepts and categories, by constantly comparing them, to form the basis of the emerging theory. An analysis of logistics operations within Wal-Mart Stores, Incorporated, and Dell Computer Corporation allowed the author to compare and contrast commercial logistics against military logistics. Results of the analysis of Wal-Mart Stores, Incorporated, and Dell Computer Corporation appear in chapter 4.

Lieutenant General McKissock pioneered the ILC initiative while serving as Deputy Commandant, Installations and Logistics, Headquarters, USMC. Lieutenant General Kelly succeeded Lieutenant General McKissock and renamed the original ILC concepts and principles, LOGMOD. Lieutenant General Kelly renamed the concepts and principles because the ILC terminology had lost appeal within the USMC. Additionally, Lieutenant General Kelly obtained General Hagee's support for implementing LOGMOD.

The author selected six elements; ILC, OA, VM, commercial logistics operations within Wal-Mart Stores, Incorporated, and Dell Computer Corporation, and the MDC to apply the research methodology. Four qualitative variables, inventory management, integrated distribution, customer satisfaction, and use of modern IT, served as analysis criteria, to delineate emerging concepts associated with the six elements.

CHAPTER 4

ANALYSIS AND FINDINGS

As we select our forces and plan our operations, we must understand how logistics can impact on our concept of operation. Commanders must base all their concepts of operations on what they can do logistically. (1997,7)

General A. M. Gray Jr., USMC
(Retired), 29th Commandant

This chapter provides an analysis of LOGMOD initiatives by comparing intent with results. In consonance with chapter 3, the author reports on ILC, OA, VM, and MLC operations with a focus on supply and transportation, commercial logistics operations within Wal-Mart Stores, Incorporated and Dell Computer Corporation, and the MDC.

Integrated Logistics Capability

Fostered by the DoD's impetus on improving logistics, ILC aimed to modernize logistics to provide superior support to the MAGTF. ILC addressed existing processes that were complex and focused on process adherence instead of process improvement. Prior to implementing ILC, USMC logistics processes supported garrison settings and were not adaptive to changing battlefield scenarios. "As a result of inefficient and cumbersome logistics processes, 31% of active duty USMC personnel served in CSS billets" (Love 2002, 2). The pie chart in figure 2 depicts assignment of 137,200 personnel within the USMC personnel by the five categories of administration, ground combat, aviation, ground logistics, and communications, computers and intelligence (C4I); and supports an argument that improved logistics processes reduces CSS personnel requirements so that more personnel can serve in combat arms related billets. Assignment

of additional personnel to combat arms billets is expected to reduce the frequency of personnel deployments and lessen the level of stress experienced by military families.

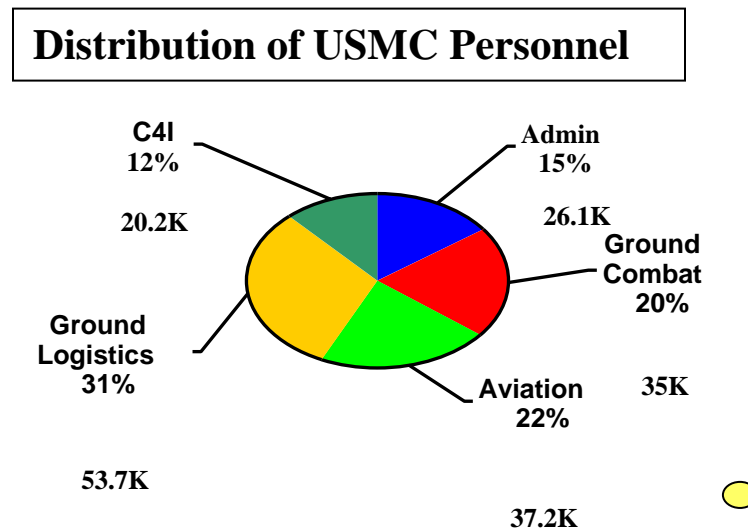


Figure 2. USMC Distribution of Personnel by MOS
Source: Love 2002, 36

The ILC initiative began within the 2d FSSG, Camp Lejeune, North Carolina, in 2001 to test the principles of continuous process improvement and to exploit core competencies of personnel serving in maintenance and supply professions. Second and third EOM functions and personnel who performed these maintenance functions were divested from the six battalions within 2d FSSG and consolidated in 2d Maintenance Battalion. Consolidating maintenance functions and maintenance personnel reduced the number of operating facilities and optimized MOS skills.

The 2d Maintenance Battalion performed bumper-to-bumper maintenance and witnessed a noticeable drop in equipment readiness. “Engineer equipment readiness

dropped from 90% to 82% and motor transportation equipment dropped from 87% to 62%” (Love 2002, 13). Though the 2d FSSG experienced a drastic reduction in readiness rates due to increased managerial supervision and greater defect scrutiny, the consolidated maintenance model prove advantageous because of improved maintenance productivity, broadened mechanics competency, and an ability to prioritize and focus the maintenance effort using economies of scale. The consolidated EOM model proved effective during OIF, and the model remains operational within 2d Maintenance Battalion, 2d FSSG.

Inventory Management. The second component of the ILC initiative included consolidation of these traditional supply functions: mechanized property accounting, sub-custody equipment accounting procedures, fiscal management, warehousing, personal effects management, and requisition control; within 2d Supply Battalion, 2d FSSG to improve inventory management. Previously, each battalion contained a supply section and supply personnel performed the supply function listed above. In consonance with the collapsed EOM initiative, consolidation of supply functions allowed the battalion to excel in performing core competences and sought to improve logistics support by capitalizing on effective employment of personnel.”Analysis of ILC’s consolidation of supply functions initiative produced a stove-piped officer career path, redundant property control procedures, a complex budgetary and financial management system, and difficulties in reporting equipment readiness to higher headquarters” (Love 2002, 20).

Integrated Distribution. This variable did not apply to the ILC initiative.

Customer Satisfaction. The consolidation of supply functions model that deployed with 2d Supply Battalion, MLC, during OIF received poor customer satisfaction reviews

because the MLC's subordinate units experienced difficulties coordinating responsive supply support. Organic supply support was an issue because the distance between the supported units and 2d Second Supply Battalion increased. The 2d Supply Battalion served as the MLC's principal unit for arranging and conducting supply support in Kuwait while simultaneously, providing operational level supply support for I MEF forces operating in Kuwait and Iraq. The 2d Supply Battalion experienced systematic problems in managing the large quantities of Class IX items. The consolidation of supply functions model was disbanded during 2004 and organic supply accounts were reestablished in 2d FSSG's battalions.

Use of Modern IT. Personnel within the 2d FSSG used the existing ATLASS program as the primary IT to record, manage, and monitor supply and maintenance operations to support the ILC initiative.

Operational Architecture

During 2002, 2d FSSG initiated the OA initiative to improve CSS amongst its seven battalions. The OA streamlined the procedure for requesting and receiving CSS by creating a linear relationship with the supported battalion, RM, the coordinating section, OM, and the supporting battalion, CM.

Inventory Management. Procedurally, the RM submitted the CSS request to the OM, which was subordinate to G-3,FSSG, the OM documented the request and forwarded the request to the appropriate CM. The CM acknowledged supportability and replied to the OM, the OM informed the RM of the capability or lack of capability to support the CSS request and monitored fulfillment of requested per the requested delivery date.

Integrated Distribution. The OA model eliminated battalion-to-battalion communications and allowed the battalions to focus on core competencies. The OM section synthesized the CSS request and coordinated with TSB to arrange distribution of the requested CSS. The uniqueness of the OA terminology is that battalions performed the RM, OM, and CM roles and responsibilities depended upon the flow of the CSS request. Figure 3 illustrates the OA process flow.

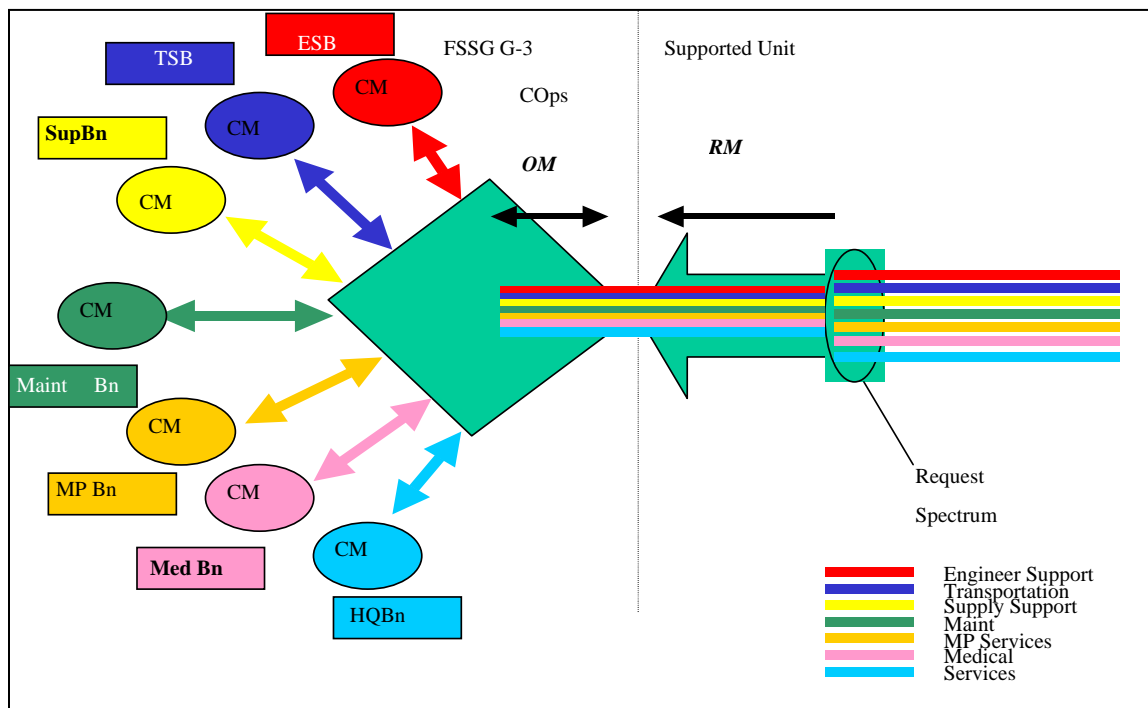


Figure 3. Illustration of the OA Initiative

Source: Scott 2002, 1

Customer Satisfaction. Personnel with MOS designations to match the type of CSS (i.e., supply, maintenance, engineering, transportation, engineering, etc.) that could be requested from the supported battalions were assigned to the newly created OM section. Conceptually, assigning MOS specific personnel to the OM section reduced the

amount of coordination and vetting required by the supported battalions. The OM section mirrored a typical customer service department in that the supported battalions were only required to submit their CSS requests.

The OM section was renamed Current Operations Sections (Cops) to reflect a military connotation. The OA model was used by the MLC during OIF to integrate the CSS support requirements both internal and external to the MLC's subordinate requirement. While deployed in Kuwait, the author examined the OA model and identified a need for better trained personnel to perform the OM function along with a requirement for an IT enabler to integrate the RM, OM, and CM functions on both secure and non-secure logistics support networks.

Use of Modern IT. The author's personal analysis of the OA initiative revealed a need for an IT enabler to link RM, OM, and CM functions and to provide personnel with real time status of actions taken on the CSS requests. Visibility of activities occurring within the logistics chain promotes confidence in the reliability of battlefield logistics and allows personnel to plan for upcoming events. The OM section created a manual database to track the status of the CSS requests. OM personnel required additional training to prevent redundancies in duties and responsibilities and to provide a feedback mechanism between the RM, OM, and CM functions.

Velocity Management

The VM process improvement methodology allowed Army customers nation wide and around the world to receive responsive logistics support from the commercial supply chain. Improving logistics required personnel to view logistics as a set of related processes designed to meet customer needs.

Inventory Management. VM focused on repair, OST, and stockage determination, which resulted in dramatic improvements in the efficient repair of needed parts, quick and dependable delivery, and ability to position stocks in the right place. “Better repair processes; faster supply process, and more appropriate inventory management lead to improved mission readiness, improved deployability, and a cost-efficient military” (Wang 2000, 45).

Integrated Distribution. Scheduled truck deliveries resulted in a reliable and high performance distribution system that allowed delivery of high volume shipments from primary depots to customers. Previously, customers received supply support stocks from multiple sources. The key learning point is that a committed focus on ensuring customer satisfaction requires detailed analysis of the supply chain and a willingness to eliminate nonvalue added processes.

Customer Satisfaction. These customer centric processes addressed equipment repair, stockage optimization and responsive OST; and included establishing performance metrics such as time, quality, cost, and RCT. “VM recognized the importance of supportive and mission-oriented leadership. With strong leadership and a supportive organizational structure, the Define-Measure-Improve (D-M-I) methodology allowed the organization to achieve continuous improvement” (Wang 2000, 10).

The steps of D-M-I methodology defined the process, measured process performance, and improved the process. These steps were critical to implementing successful LOGMOD initiatives. Figure 4 illustrates the D-M-I methodology.

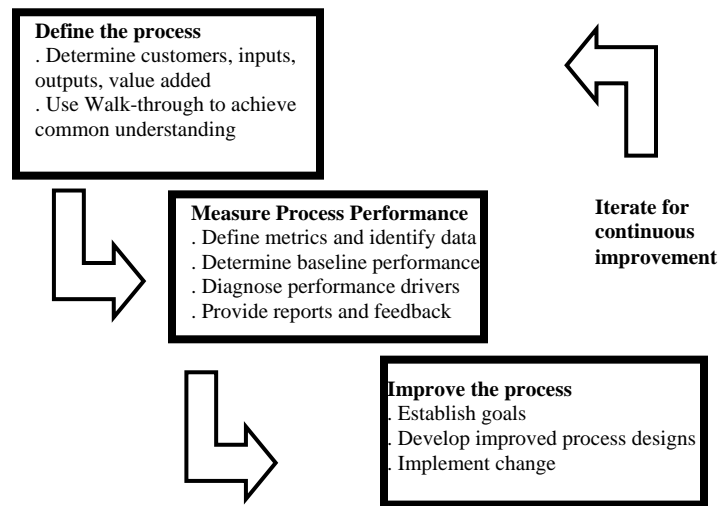


Figure 4. The Define-Measure-Improve Methodology
Source: Wang 2000, 11.

“Supply processes improved aboard Fort Bragg, NC due to leadership commitment, simple rules, measurement with feedback, streamlined review, scheduled truck deliveries, higher fills from chief depot, and direct delivery to customers” (Wang 2000, 25).

Use of Modern IT. This variable did not apply to the VM initiative.

Commercial Logistics Practices (Dell Computer Corporation)

Similarities existed between military logistics and commercial logistics. Both logistics systems attempted to streamline cost, reduce OST, eliminate nonvalue processes, and provide quality customer support. Some argued that military logistics does not have to be as focused and responsive as commercial logistics because the military is not profit oriented. Nonetheless, and without introducing personnel opinions, prudent and proven commercial logistics practices offered a model to improve military logistics.

Inventory Management. Analysis of Dell Computer Corporation logistics operations provided evidence that an integrated supply chain, focused on customer service, established trust and reliability amongst customers and suppliers, illustrating Dell's commitment to customer satisfaction. Dell's direct relationship with customers provided knowledge of customer's needs and allowed Dell C to strategically segment the market.

Procedurally, when Dell receives an order from a customer, the order is broken down into a list of the parts needed to build the computer. The list of parts are compiled and electronically relayed to the appropriate supplier. Suppliers know the production timelines and can organize their production processes to meet the specification for the computer components. These components are delivered to Dell from each supplier; arriving where and when needed in the production process (Dell Computer Corporation 2005, 3).

Integrated Distribution. Dell managed the entire distribution channel from the procurement to the delivery of the finished product or service to the customer. "By eliminating the middleman in the supply chain, Dell exerted greater control over cost and quality in the product and the efficiency of the lead-time" (Dell Computer Corporation 2).

Dell did not require large shelf space to store computer-related inventory because Dell did not use a traditional distribution channel of wholesale retailers. Dell built components and systems to meet customer specific orders which allowed Dell to mitigate the financial risks associated with owning large quantities of obsolete inventory.

Customer Satisfaction. Suppliers and Dell's customer service department remained integrated so that customers could go on-line at any time and obtain the current

status of their order. Dell's ordering process mirrored ITV principles and promoted customer confidence in Dell's reliability and dependability.

Use of Modern IT. Dell used the Internet to connect customer, supplier, and its engineers in a real-time setting. Further, use of the Internet supported Just in Time (JIT) delivery of key components to Dell's assembly plants; and JIT allowed Dell to avoid bulk purchase of nonvalue added equipment and supplies.

Commercial Logistics Practices (Wal-Mart Stores, Incorporated)

The author illustrates the interrelatedness and importance of distribution and inventory management by reviewing Wal-Mart. It is important to recall that USTRANSCOM directed considerable efforts to improve logistics support to the warfighter by integrating battlefield distribution under a single process owner. The USTRANSCOM model serves as an excellent frame of reference to compare and contrast Wal-Mart's business model. During a recent visit to USTRANSCOM's headquarters at Scott Air Force Base, Illinois, USTRANSCOM representatives informed the author and other CGSC officers that its DPO initiative was bridging the gap between strategic, operational, and tactical logistics. USTRANSCOM worked closely with regional combatant commanders to identify and resolve logistics shortcomings that could adversely impact military operations. USTRANSCOM relied heavily on the logistics support resources of operation and tactical level organizations to coordinate distribution down to the last tactical mile.

Wal-Mart is the world's largest retailer, with \$256.3 billion in sales in the fiscal year ending 31 January 31 2004. The company employs 1.6 million associates worldwide through more than 3,600 facilities in the United States and more than 1,570 units in

Mexico, Puerto Rico, Canada, Argentina, Brazil, China, Korea, Germany, and the United Kingdom. More than 138 million customers per week visit Wal-Mart (Wal-Mart Stores, Incorporated 2005, 1).

Kmart's recent filing for bankruptcy highlighted the success of Wal-Mart's business model. "Wal-Mart is in a position to gain customers from one of its main rivals. Kmart attempted to model itself after Wal-Mart, but Kmart lacked Wal-Mart's culture to include the supply chain and a strong commitment to customer satisfaction" (So 2002, 2).

Inventory Management. Wal-Mart's efficient supply chain management was critical to the retail giant. Wal-Mart's business strategy featured a super efficient production process in which each operation (buying products from manufacturers, distributing them to the retail stores, and selling them to customers) was linked to the next in a continuous JIT methodology. Wal-Mart takes pride in providing customers with quality merchandise and services at the lowest possible prices without being undersold by competitors. Wal-Mart achieved unprecedented growth by adopting a holistic business model that reflected a shrewd corporate strategy and supported an atmosphere of one stop shopping.

Integrated Distribution. Wal-Mart strategically positioned distribution centers to sustain regional stores and owned its distribution assets. "A typical distribution center occupied more than one million square feet, or the equivalent of ten Wal-Mart retail stores. More than 250 dock doors served the fleet of Wal-Mart's trucks that wait in the vast parking lots surrounding the buildings" (Wal-Mart Stores, Incorporated 2005, 1).

IT linked the supporting distribution center with the supported stores, and because Wal-Mart owned its distribution process; resupply of stores was responsive. This strategy

allowed Wal-Mart to eliminate positioning inventory in each store's warehouse. Wal-Mart converted the store warehouse space to additional showroom, and the additional showroom allowed Wal-Mart to display an expanded selection of items. The expanded showroom attracted a broad customer base and assisted Wal-Mart in establishing and maintaining customer allegiance.

Customer Satisfaction. Analysis of Wal-Mart's operations illustrated the benefits of focusing on customer satisfaction and the importance of managing the full spectrum of the supply chain. Wal-Mart's investment in modern IT augmented established business processes and proved decisive in eliminating competitors. Wal-Mart's strict adherence to a well-defined corporate culture supported the firm's rapid expansion in the US and in foreign markets.

Use of Modern IT. Wal-Mart remained keen on market conditions and ensured its inventory and corporate atmosphere attracted customers in droves. Wal-Mart skillfully managed its entire supply chain to include wholesalers, distributors and retailers. IT played a pivotal role in Wal-Mart business operations, and Wal-Mart led the retail industry with use of the RFID system. RFID tags were attached to every item, and this technology helped Wal-Mart track and monitor inventory. Knowledge of the frequency and amount of inventory consumption allowed Wal-Mart to negotiate competitive prices with its suppliers.

Marine Logistics Command

The author researched the MLC's operations during OIF to show the strengths, weakness, and interrelatedness of supply and transportation during combat operations.

The MLC established its base of operations at Camp Logistics Support Area (LSA) FOX, Kuwait, which is approximately 550 miles south of Baghdad, Iraq.

Inventory management. The MLC provided operational logistics support to Marine Forces operating in the United States Central Command Area of Responsibility, provided personnel to offload three MPSRONS, coordinated with the 377th Theater Support Command (TSC) to conduct theater distribution, and served as the primary conduit for operational level CSS common item support and line haul requirements to support I MEF. The MLC conducted planning and execution of reconstitution, regeneration, and redeployment for forces and equipment. The MLC conducted port operations at Kuwait Naval Base (KNB) and As ‘Suaiba Port to support follow-on shipping and reception of USMC prepositioned war reserve stocks.

Supply support played a critical role in I MEF’s successful defeat of Iraqi forces during OIF. Supply Battalion performed traditional supply support functions to support the MLC’s mission.

Supply Battalion’s ISSA filled 70,070 of 108,743 demands. These demands were 2.5 times the garrison volume, and Supply Battalion completed this task with 1/3 the amount of garrison personnel. Supply Battalion purchased more than 72 million dollars in consumable stock and issued more than 18 million dollars of Class VIII medical supplies. Supply Battalion executed and administered over 600 contracts totaling more than 115 million dollars. (Marine Logistics Command 2003, 14)

The MLC operated two Field Ammunition Supply Points (FASP) that were fifty miles apart. One FASP was located in Iraq, and the primary FASP was located at Camp LSA FOX. The FASP at Camp LSA FOX occupied 18 square miles and was the largest FASP in USMC history “The MLC issued 9,126 pallets of ammunition and issued more

than 330,000 tactical maps to 1st FSSG. The 1st FSSG served as I MEF's tactical level logistics provider during OIF" (Marine Logistics Command 2003, 16).

Integrated distribution. Responsive distribution of sustainment was vital to 1 MEF's success during OIF as more than 50,000 personnel served with 1 MEF. TSB served as the MLC's principal transportation agent. TSB established its base of operations at LSA Viper in Southwestern Iraq to support I MEF's northward attack. "TSB distributed sustainment over a 400-mile battlespace and dispatched over 1400 convoys that had an average duration of 41 hours and consisted of 60 vehicles" (MLC Brief to Gen Hagee 2003, 17).

TSB delivered 2.6 million gallons of fuel during combat operations, integrated commercial and tactical lift to shorten LOCs, and provided 1 MEF with sufficient sustainment to support all phases of OIF (Marine Logistics Command 2003, 17).

The MLC created Marine Logistics Command Support Detachment One (MSD 1) to assist TSB with battlefield distribution. MSD 1 established its base of operations in Northern Kuwait and distributed sustainment throughout Kuwait. MSD-1 used a combination of USMC organic equipment, to include MTRVs and LVS's and host nation contracted tractor-trailers. MSD-1 linked sustainment operations amongst the MLC, TSB, and I MEF; and delivered sustainment as far north as Camp LSA Viper where it conducted cargo transfer with TSB.

"MSD-1 drove 763,263 miles, dispatched 557 convoys, transported over 124,000 gallons of Class III MOGAS fuel and 2.1 million gallons of JP-8; and transported more than 3,000 ISO Containers and 2,300 pallets" (Marine Logistic Command 2003, 18).

Customer Satisfaction. MLC operations during OIF represented the first use of the MLC model in combat. Though the MLC received favorable comments from BGen Usher, Commanding General, 1st FSSG, and BGen Lehnert, Commanding General, MLC, upon completion of OIF-I; an analysis of MLC operations yielded several key lessons learned. These transportation related lessons learned included a realization that organic line haul assets were insufficient to sustain the USMC through 2015 and a replacement for the LVS was financially critical considering the MLC spent \$21.5 million contracting host-nation line-haul assets.

MLC operations revealed these supply support related lessons learned: multiple supply systems were too cumbersome and were not interoperable, military organizations needed to partner with wholesale supply sources and DoD to develop one supply system for Classes I, III (B), V, VIII and IX; and the war reserve system was underfunded and was too reliant on the industrial base (Marine Logistics Command 2003, 26).

On a positive note, the MLC extended the operational reach of I MEF combat forces by equipping the tactical level commanders with necessary sustainment, ensuring timely throughput of sustainment at KNB and the Port of As' Suaiba, and capitalizing on host-nation contracting to reduce the MLC's logistics footprint.

Use of Modern IT. In addition to the lessons learned in the preceding paragraph, MLC operations revealed an inability of Army's 377th TSC to provide common item support and common user land transportation assets due to personnel and equipment shortages, lack of sufficient and secure communication assets to provide reliable communication over extended distances, lack of an integrated logistics IT enablers, lack

of TAV and ITV capabilities, and a requirement for additional bandwidth to support maintenance and supply functions (Marine Logistics Command 2003, 26).

The MLC and I MEF operated different logistics IT enabling systems and required an electronic interphase to manipulate data so the MLC could process CSS requests on behalf of I MEF. Specifically, units did not have automated ITV of push and pull sustainment within the logistics chain. Due to an absence of ITV and an unreliable delivery of sustainment, units often requisitioned excess supplies and materiel, which congested the supply chain and the transportation distribution network.

MLC personnel worked closely with representatives from Marine Corps System Command (MARCORSYCOM) during OIF to implement the Common Logistics Command and Control System (CLC2S) to enhance C2 by providing units with near real time visibility of personnel and logistics processes. CLC2S was partially implemented within the MLC because of connectivity issues related to operating CLC2S on simultaneous Secure Internet Protocol Router (SIPR) and Non-secure Internet Protocol Router Net (NIPR) networks.

Class IX Distribution during Operation Iraqi Freedom

The author reported on Class IX operations during combat to illustrate the need for revamping inventory accounting and distribution procedures. The availability of adequate quantities and the distribution of Class IX repair parts were critical because major weapons systems were used extensively. Major weapon systems operated over rugged terrain covering extended distances, and these weapon systems sustained above normal operational damages.

Personnel assigned to MCLAT analyzed Class IX distribution during OIF to identify internal and external systematic problems and to establish a model for future military operations. The analysis was conducted using an E2E approach, which included mapping the logistics processes, data analysis, interviewing key process managers/owners, and step-by-step tracking of demands through the logistics chain from order entry to order fulfillment. Step-by-step individual process flow maps with narratives, an end-to-end request matrix summary, and a request matrix summary were used to validate the analysis.

The analysis identified a critical need for a centrally managed logistics support process, grouped with the supporting IT. The rapid pace executed by the maneuvering forces did not outrun logistics support, but the magnitude and speed of the operation exposed weaknesses in the logistics chain.

A list of issues which adversely affected Class IX support included late setup of the MLC at Camp LSA FOX, technical problems with STRATIS which proved defective and was rendered inoperative, lack of centralized command and control of the distribution process, poor information flow between I MEF and MLC, presence of multifaceted and multi-layered processes, lack of a shared data environment, and duplication of multiple process steps. (Pennington 2003, 24)

As the principal supply lines extended forward, many fragmentary processes developed and integrated into the primary processes, which caused front line units to experience delays in receiving supplies. There were numerous instances where duplicate CSS requests processed in ATLASS because units ordered excessive supplies.

Limited IT denied the supported unit and Combat Service Support Detachments (CSSD) the means to determine or prioritize requirements in real time or the ability to receive a real time response. This prevented the logistics chain from providing the correct supplies, at the correct time, to the correct supported unit.

TAV between the MLC and combat service support elements/detachments was not available. This lack of TAV led to duplicate requests, redundant process steps, misrouted shipments, logistics choke points at the Combat Service Support Battalion's (CSSB) and an inability to track the supplies that were pushed forward on the battlefield (Pennington 2003,25).

Figure 5 illustrates the support relationships between the MLC and I MEF supported CSS units during OIF.

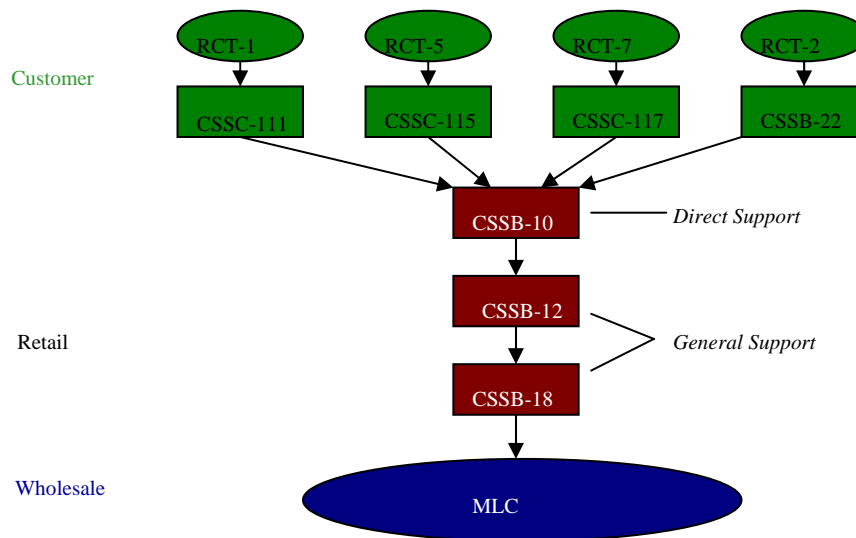


Figure 5. Relationship between MLC and Supported Units
 Source: Pennington 2003, 9

The inability to accurately identify and forward supplies throughout the entire logistics chain resulted in delayed logistics support to the supported units. This led to units receiving too much of particular items they did not need and not receiving enough critical items.

Materiel Distribution Center

The author selected the MDC's design and operational effectiveness as the centerpiece of the research thesis. The MDC operated under the command and control of 2d Supply Battalion, 2d FSSG. The MDC's mission was to integrate the functions of supply, transportation, shipping, receiving, and packaging and establish a single distribution process owner for the MEF. The activation of the MDC illustrated a commitment to improving logistics support by supporting the last tactical mile on the battlefield. The MDC accomplished this task by using RFID technology and providing units with an ITV capability.

Inventory Management. OIF revealed major challenges within the USMC materiel distribution process. "First Marine Division identified resupply of Class IX repair parts as the principal logistics failure of OIF" (Lepson 2005, 4)

The movement of Class IX was affected by the need to source individual parts in a deployed environment and to track those parts through an extended pipeline with multiple disjointed agencies. "A year after the end of OIF, a number of cumbersome, stovepiped distribution processes existed and it took approximately 23 days to acquire critical parts from Camp Lejeune and deliver to Marine units deployed in Haiti" (Lepson 2005, 4).

The major cause for delays in distribution occurred because distribution planning and execution were not well coordinated, and there was no single distribution process owner to synchronize distribution and manage distribution through all phases of the operational and tactical levels of war. Customers or supported units were responsible for coordinating and executing their own distribution support which generated disjointed and

competing requirements; therefore, different processes and organizational design were used in deployed and garrison environments.

There were occasions when there was a lack of demand and shipment visibility for particular sustainment items because there were numerous distribution chains based upon the item's SOS. Poor ITV and a lack of an integrated distribution process affected responsive and effective distribution of sustainment. To address these recurring logistics challenges, II MEF initiated a LOGMOD initiative so that the E2E distribution process was organized and resourced to provide supported units with the confidence and knowledge that logistics support would be provided when and where needed.

LOGMOD was influenced by a hierarchy of working and advisory groups that developed and recommended initiatives for improving logistics to USMC' senior leadership. The scope of II MEF distribution included an E2E focus for managing, coordinating and executing the logistics functions of transportation, traffic management, materiel handling and packaging, transshipping, in-transit visibility, and flow of information necessary for effective and efficient management of responsive distribution to the operating forces (Lepson 2005, 4).

The MDC initiative generated efficiencies that resulted in reductions in inventory, infrastructure, transportation assets, personnel, and time. "These reductions were generated by eliminating redundant processes, providing more visibility and establishing trust and confidence in the supply system" (Lepson 2005, 8).

Integrated distribution. The MDC concept was implemented because the existing distribution processes did not adequately support the warfighter. The MDC provided a

materiel distribution planning and execution focal point and included process changes and modern IT enablers.

Integrated distribution reduced the need for large inventories and reduced the probability of units submitting multiple requisitions for the same item. More importantly, the MDC proved effective in ensuring that the right parts got to combat units based on the commander's priorities.

Fundamental business process improvements, organizational integration and IT enablers supported the MDC concept by synchronizing distribution to maintain throughput velocity and sustain operational tempo. Confidence in the logistics chain improved when knowledge of what was moving and where it was moving was accurately recorded.

A continued focus on E2E distribution planning and execution is expected to facilitate the flow of materiel through the logistics chain and ensure that distribution of sustainment goes where it is needed, when it is needed.

Customer Satisfaction. The merging of various MOS's increased the effectiveness of distribution personnel and eliminated recurring redundancies. One new feature of the MDC was the placement of distribution liaison cells at key distribution nodes. These cells worked with the distribution centers to maintain visibility of USMC cargo. Another feature of the MDC was the establishment of an integrated shipping office (ISO). The ISO provided a one-stop shop to units requiring freight services. Units were previously required to coordinate individually with four separate providers. Units are now able to have all packaging, preservation, hazardous materiel, documentation, and freight needs met by one organization.

The Deputy Under Secretary of Defense, Logistics and Materiel Readiness (DUSD) (L&MR), initiated the DoD Logistics Balanced Scorecard program in 2002. The DoD Logistics Balanced Scorecard began in response to the vast transformation and modernization efforts in logistics. In addition, it addressed Management Initiative Directive (MID) 901, which prioritized and defined the importance of performance management activities and alignment with the President's Management Agenda, and promoted use of the balanced scorecard concept as the management framework for the DoD.

The Joint Logistics Board (JLB), which is comprised of senior logisticians throughout the Military Services, Agencies and Commands, provided the strategic direction, mission and objectives for the DoD Logistics Balanced Scorecard. The JLB supported this critical performance management initiative by providing strategic guidance and program oversight.

The MDC used the USMC Logistics Balanced Scorecard to measure its initial progress and success. Key evaluation metrics of the USMC Logistics Balanced Scorecard included readiness, responsiveness, flexibility, assets, expenses, and reliability. The USMC balanced scorecard measured volume demand of customer, processes and resources. The reliability, readiness, flexibility and reliability of the integrated distribution process reflected that the MDC model was successful. Figure 6 depicts the USMC Logistics Balanced Scorecard.

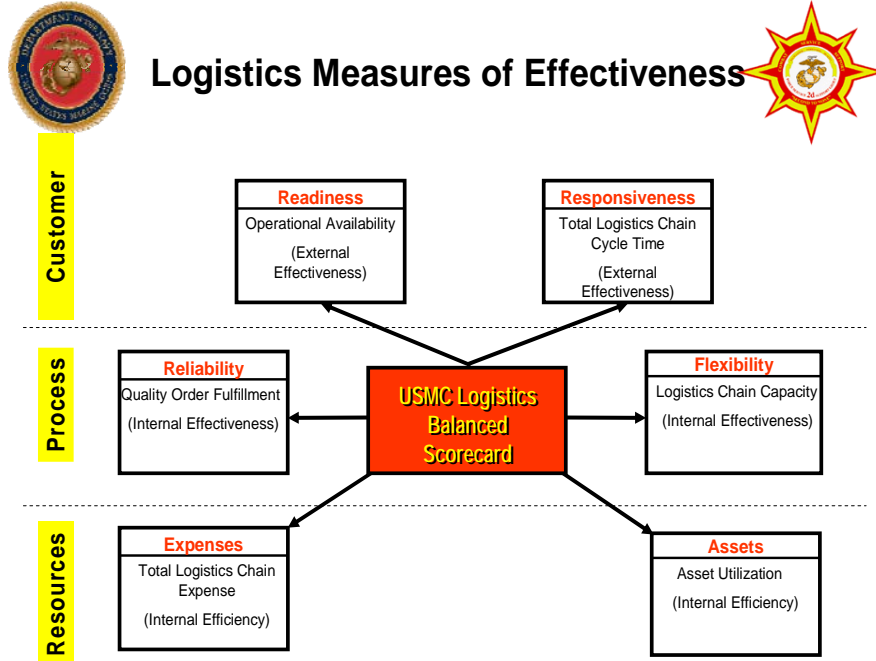


Figure 6. USMC Logistics Balanced Scorecard

Source: Kelly 2003, 23

Use of Modern IT. Modern IT augmented MDC operations and allowed creation of one logistics common operating picture for timely distribution management and decision support using real-world information. The MDC expanded use of RFID technology and vehicle tracking systems and used the Battle Command Sustainment Support System (BCS3) in daily operations. BCS3 was integrated within the MDC as the centerpiece of the Materiel Distribution Operations Center.

The MDC took lead within the 2d FSSG and II MEF in using RFID technology to enhance logistics operations. Figure 7 provides an illustration of components used in the RFID technology.

The DoD envisions using RFID technology to facilitate accurate, hands-free data capture to support military and commercial processes throughout the supply chain.

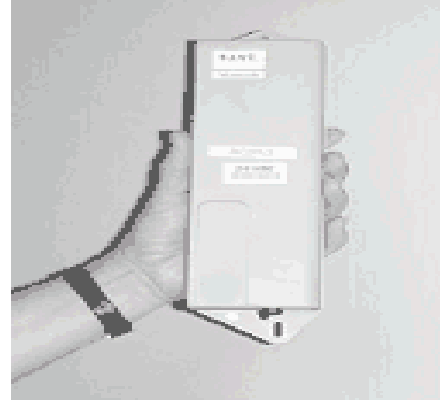
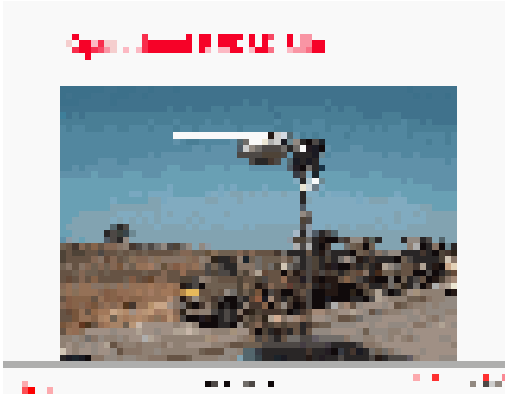


Figure 7. RFID Technology.

Source: Lepson 2005, 6.

Additional consideration was given to the physical movement of materiel between and within logistics nodes. Vistars and the iridium vehicle tracking systems provided the MDC and commanders with visibility of the vehicles transporting cargo. Figure 8 provides an illustration of vistars and the iridium tracking system.

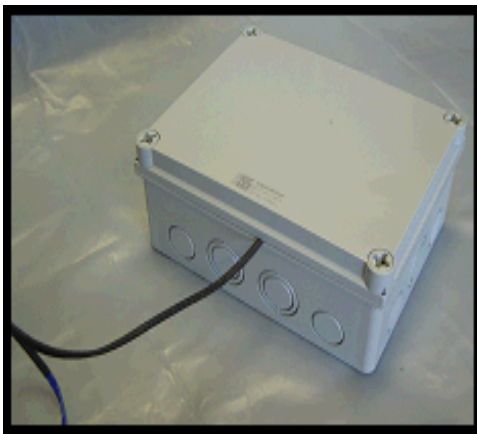


Figure 8. Vistars and Iridium Vehicle Tracking System

Source: Lepson 2005, 7.

BCS3 provided real-time ITV of cargo movement via RFID and vehicle-tracking systems. Real-time updates were provided for all materiel moving within an area of operations. Alerts provided the location of lost or frustrated cargo. The MDC served as the principal agent within 2d FSSG for the implementation of these modern IT enablers and was responsible for educating affiliated personnel on use of these IT enablers within the scope of MDC concepts and operating procedures. Figure 9 provides on screen shots from BCS3.

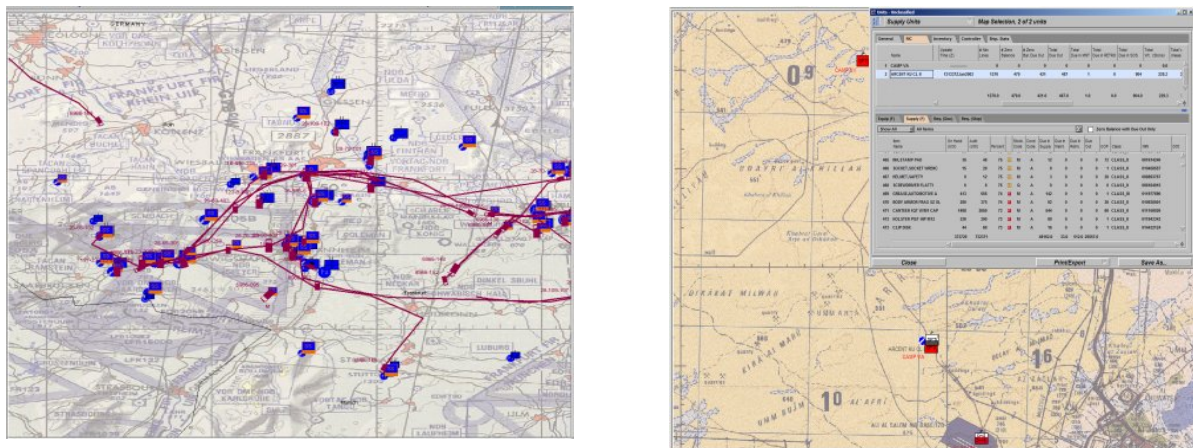


Figure 9. Battle Command Sustainment Support System
Source: Lepson 2005, 7.

Summary of MDC Interview Questionnaire

The author selected four individuals affiliated with the MDC to complete an interview questionnaire to provide qualitative information on the MDC's design and operational effectiveness. Due to a recent deployment to Iraq, three individuals were not able to complete their interview questionnaires.

First Lieutenant Scott Beatty served as Current Operations Officer and Executive Officer, MDC and provided qualitative information on the MDC. First Lieutenant Beatty completed a descriptive MDC Interview Questionnaire that focused heavily on organization, customer service, personnel, deployability, integrated distribution, and ITV. First Lieutenant Beatty's responses to MDC Interview Questionnaire appear in appendix A.

First Lieutenant Beatty's responses reflected a supported position that the MDC initiative was effective and favorably received by units operating aboard Camp Lejeune, North Carolina, because supported units could track the status of equipment as it traveled aboard Camp Lejeune, North Carolina. This ability to monitor equipment prevented duplicate orders which previously congested the logistics chain. Personnel assigned to the MDC possessed the intellectual capacity to perform their duties and a harmonious relationship existed between TSB, 2d FSSG Headquarters, and the MDC. From a personnel savings and operational efficiency perspective, the MDC coordinated delivery to II MEF units aboard Camp Lejeune, North Carolina, using 10 MTVRs. Previously, each II MEF unit requested a vehicle to pick up requisitioned items from the ISSA and TMO.

First Lieutenant Beatty's view that the MDC model was deployable proved factual during January 2005. Constant evaluations and assessments from personnel serving with II MEF Headquarters, MCLAT, Marine Forces Atlantic, and HQMC ensured that MDC operations supported USTRANSCOM's assignment as the DoD's single process owner for distribution. Commensurate with DoD's vision of implementing modern IT to enhance logistics operations, the MDC used RFID technology to provide

customers with ITV knowledge of sustainment detailed to the national stock number and designated convoy.

MDC Operations in Combat

Use of the MDC model in a deployed combat environment provided an excellent opportunity to validate the MDC's effectiveness and responsiveness. Over the past two years, representatives within 2d Supply Battalion, 2d FSSG worked on improving logistics support capabilities using RFID technology.

During January 2005, elements of the 2d Marine Logistics Brigade Forward (MLB Fwd), formerly 2d FSSG Fwd, deployed to Iraq in continued support of OIF. The 2d MLB Fwd's primary mission was to provide support to warfighters throughout the II MEF Fwd's area of operation. ITV enhanced 2d MLB Fwd's ability to provide the full range of logistics support at the right time, right place and in the most efficient and effective manner.

Key personnel affiliated with implementation and operation of the MDC model deployed with the 2d MLB Fwd to Iraq during 2005. These personnel used the MDC's operating principles and concepts. Marines assigned to the 2d MLB (FWD) used ITV to speed delivery times and provide service members with the capability to track shipments of supplies from the vendor to the supported units.

The new tracking system had two main components: RFID tags located on the shipments and satellite-tracking devices placed on the vehicles to track the gear. RFID tags provided identification of items or containers and this information was automatically read without manual intervention.

Procedurally, Marines used hand-held scanning device to see what was inside the container, rather than opening the container to inventory its contents. Pallets were loaded on trucks equipped with satellite-tracking sensors to provide commanders an ability to see what equipment was in the pallets and to track the location of the equipment throughout the convoy (see figure 10). A key difference between logistics during ODS and OIF was knowledge of what was available to the warfighter and how these equipment and supplies were tracked on the battlefield.

It is easy, the warfighter, can place an order from the field, and we just pull the items from our shelves and deliver them, said Major Michael Lepson, officer in charge MAGTF Distribution Center, Combat Logistics Regiment 25. The customer can then track the requested item from the time it is palletized until it reaches him. (Oneil 2005, 1)

Marines on the battlefield have the same amount of confidence their families have when purchasing goods on-line and tracking their order. Marines no longer have to spend hours searching for a critical repair part or SECREP. Battlefield commanders know what they have and need, and most important, they know where their supplies are at all times. The ultimate benefit of a responsive and streamlined supply chain is an improved degree of operational readiness in garrison and deployed environments.

Before now, we never knew where anything was, said Maj. Michael J. Murchison, operations officer, Supply Management Unit, and Detroit native, Marines used to spend hours dumpster diving (searching for items), often times we would have our flashlights out, looking through containers to find the pair of size 8 boots. (Oneil 2005, 2)



Figure 10. Brief on Use of Intransit Visibility System
Source: Oneil 2005, 3.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

The research proved that LOGMOD efforts are worthy endeavors that must be methodically and intellectually implemented. Logistics and military operations are mutually inclusive, and this inseparable relationship requires leaders to monitor the effectiveness and responsiveness of logistics. As US military forces transform to meet new threats and challenges, introduce refined battlefield command and control systems, and operate technologically advanced weapon systems, the logistician's responsibility to equip, maintain, sustain, and project the force is vitally important. Far too often within the Armed Forces, executive emphasis is placed on either purchasing a new weapon system or modernizing an existing weapon instead of devoting commensurate emphasis toward modernizing logistics processes and resources.

Successful LOGMOD requires forward-thinking and intellectual professionals willing to accept emerging concepts and opportunities in lieu of status quo. President Franklin D. Roosevelt's famous statement, "We have nothing to fear but fear itself" (FDR's Inaugural Address 1933, 1), should resonate within the logistics community and invigorate military personnel to replace ineffective, status quo procedures and processes with responsive, comprehensive, and user friendly processes and procedures that enhance logistics support to the warfighter in garrison and deployed environments. The MDC model addressed the frequently discussed challenges of providing units with ITV and TAV capabilities. ITV and TAV promote confidence in the reliability of battlefield sustainment. ITV and TAV are expected to gain additional attention in the immediate

future as military forces posture themselves to engage and defeat nontraditional, elusive enemy forces.

The research documented the adverse effects that poor logistics had on military operations. Specifically, supply and transportation operations were not integrated under a single process owner; therefore, inefficiencies and redundancies congested the logistics chain, which resulted in excessive costs and delayed delivery of sustainment. Analysis of primary and secondary data identified realistic opportunities to correct recurring logistics shortcomings.

Each LOGMOD initiative, to include OA, ILC, VM, and MDC; illustrated a commitment to improving the quality of logistics support provided to the warfighter. Implementing new LOGMOD initiatives in organizations as large and complex as the USMC required detailed process analysis, inclusion or buy-in from all echelons within the organization and methodic use of modern IT as an enabler. New initiatives are more likely to succeed when the organization clearly articulates the short and long-term benefits.

Answers to Research Questions

The research produced recurring instances where the warfighters' abilities to prosecute their mission in either a garrison or combat environment were adversely affected due to poor logistics support. Inefficient and non-responsive supply and transportation operations resulted in increased operating costs due to the purchase of excessive equipment and supplies, eroded maintenance readiness rates due to a lack of critical repair parts, and increased personnel and equipment resources that were necessary to complete cumbersome tasks. Impressive results achieved by Wal-Mart Stores,

Incorporated and Dell Computer Corporation illustrated the benefits of integrating the supply and transportation components of the supply chain to eliminate nonvalue added steps and promote unparalleled customer satisfaction. The research findings indicated that integrating supply and transportation functions under a single process owner provided responsive, effective, and efficient logistics support to the warfighter.

Positioning the MDC within the Supply Battalion was a logical decision and supported the USMC principle of exploiting core competencies. Requisitioning, procuring, inventorying, accounting, and disposing materiel and supplies are functions that are embedded within the Supply Battalion's mission. Operating the MDC within the Supply Battalion ensured that the distribution of sustainment remained a priority until the supported unit acknowledged receipt of the requested sustainment. The research findings and analysis supported placing the MDC under the command and control of Supply Battalion because a large percentage of the MDC's roles and responsibilities are supply related.

The MDC operating model integrated supply and transportation personnel. A comparison of the current duties and responsibilities performed by supply and transportation personnel against previous or institutionalized duties and responsibilities provides an excellent model to determine the effectiveness of the MDC's personnel structure. Based upon the findings of this analysis, personnel billet descriptions and individual training standards should be modified to reflect these changes so personnel productivity is optimized and personnel are uniformly educated across throughout the USMC. The research did not reveal a descriptive summation of duties and responsibilities performed by supply and maintenance personnel. A subsequent study of the optimal

personnel structure required to operate a MDC will allow senior military personnel to determine the quantity of designated MOS's that must be recruited and or which existing MOS's may be reassigned.

Upon full-scale implementation of the MDC model within the USMC, doctrine will have to be modified to reflect that the MDC provided ITV to the supported unit and integrated with G-3, FSSG, TSB, and USTRANSCOM. Publication of uniform doctrine provides a common operating framework for Marines and synchronizes academic instruction at formal military schools.

Use of RFID technology is new in the USMC. As use of RFID technology broadens, doctrine must reflect the operational use, capabilities and limitations, and associated support and maintenance requirements so that personnel and units operate uniformly.

USTRANSCOM's role as DPO provided the DoD with a single agency to coordinate distribution of resources to include people and materiel. Effective execution by USTRANCOM supported the US ability to project military force in a timely effective manner while ensuring that military forces were supported from fort to fighting hole. The MDC operating model integrated supply and transportation and provided commanders with ITV and TAV of battlefield sustainment. Tremendous parallels exist between the roles and responsibilities performed by USTRANCOM and MDC. Specifically, these agencies provide a clearly defined single process owner to integrate and coordinate battlefield distribution. The research findings provided preliminary evidence that the MDC operational model will support USTRANSCOM assignment as DoD's single process owner for battlefield distribution.

Recommendations

The author focused on analyzing qualitative data to research the pros and cons of LOGMOD in the USMC. Based upon the findings, the MDC model offered an excellent venue to improve logistics support to the warfighter. As the MDC model matures, personnel within MDC's chain of command should establish quantifiable performance benchmarks to gauge the MDC's operational effectiveness. Performance benchmarks could include data on OST, RCT, mean time to process Class IX requisitions, number of supply and transportation personnel required to perform tasks, and the cost savings achieved due to equipment accountability.

Internal assessments from MDC personnel and external assessments from MCLAT, MCLEP, and CNA are tremendous resources to provide detailed and unbiased feedback on the MDC's effectiveness, to include strengths and opportunities for improvements. The assessment agencies could assist MDC senior personnel with developing doctrine, constructing personnel billet descriptions, establishing training and education templates for MDC personnel and affiliated units, and ensuring compliance with USMC and DoD standards and expectations for LOGMOD.

Once the assessments are completed and the MDC operating model proves compatible with HQMC and DoD requirements, the MDC operating model should become operational within the 1st FSSG, I MEF and the 3d FSSG, III MEF, both are active duty units, and within the 4th FSSG, which serves as the USMC's reserve FSSG. The MDC operating model should be evaluated to determine applicability within the other branches of the Armed Forces, and where applicable, the MDC concepts and principles should be implemented.

Opportunities for Further Research

The author identified military professionals as the targeted audience when compiling the research findings and focused on supply and transportation operations to determine the effectiveness of the MDC initiative. Though the findings of the research thesis met the author's objectives, unlimited opportunities are available for expanding the research to evaluate shortcomings and opportunities in the other functions of logistics. The other functions of logistics include maintenance, personnel, medical, engineering, postal, finance, and disbursing. Optimal structure and performance of each logistics function is paramount to the warfighter's ability to prosecute military operations.

During OIF, the author conversed with US Army personnel and learned that the US Army experienced similar challenges with accountability of sustainment, distribution of sustainment, ITV and TAV. The author's research model may be used to analyze LOGMOD initiatives or synonymous efforts within the US Army.

The research focused on conducting battlefield distribution with ground transportation assets. Expanding the research to include aviation assets provides an excellent opportunity. As the US military prosecutes operations in on today's nonlinear battlefield, distribution with aviation assets is expected to increase in frequency and duration.

The State Department and other non-military governmental agencies are opportunistic candidates for implementation of LOGMOD initiatives. These bureaucratic organizations rely on logistics to perform their complex and diverse roles and responsibilities. Personnel and financial savings realized from streamlined logistics operations could be passed to the American taxpayer.

APPENDIX A

MDC INTERVIEW QUESTIONNAIRE

Materiel Distribution Center Interview Questionnaire Responses

Name: First Lieutenant Scott Beatty

Billet: Executive Officer / Operations Officer

Date: 25 FEB 05

Question 1. How do your customers rate the operational effectiveness and efficiency of the MDC?

Response: In garrison we have not received much feedback from using units. In theatre, we don't know yet because we are still in our infancy.

Question 2. Is the current MDC model deployable? If not, what changes are needed?

Response: Yes.

Question 3. Will combining supply (30XX) and motor transportation (35XX) Military Occupational Specialties (MOS) into a single MOS (XXXX) enhance MDC operations?

Response: No, however, I foresee a merge in the combining of the 0402 and the 3002 in the near future into something like a MAGTF distribution officer.

Question 4. Discuss MDC performance benchmarks and milestones.

Response: None Presently Established.

Question 5. What requisition and distribution tracking system does the MDC use and what are the IT shortfalls? (Questions related to challenges experienced during OIF related to location and composition of supported unit's sustainment)

Response: Currently we are using the ITV server, Battle Command Sustainment Support System, AMS TAC, and JTAV. The shortfall lies in the fact that we still lack the ability to link an iridium modem to a set of RFID tags

Question 6. Is 2d Supply Battalion the best location to position the MDC?

Response: Yes.

Question 7. How does the MDC interface with the supported units' requisition and inventory management system?

Response: The only interaction we currently have with the supported units requisition is

that we scan the DD 1348 in order to put the TCN on a shipping manifest. We have no interaction with an inventory system.

Question 8. List the transportation resources (personnel and equipment) that are either assigned to or subordinate to the MDC.

Response: Currently, the MDC relies on the support of TSB to provide 10 MTRV's daily, as well as drivers. Additionally, we rely on commercial freight for all outgoing shipments in support of overseas operations.

Question 9. What type and scope of training was provided to personnel upon activation of the MDC?

Response: I was not here at the inception of the MDC, but I can imagine that training in AMS TAC was a must, as well as training in BCS3 and ITV. Additionally we took PP&P and trained them in shipping assets. Finally we coordinated training with our Shipping and Receiving Platoon and instructed the A-drivers on their duties as they made resupply runs.

Question 10. Explain how the MDC will function at the tactical level (I MEF) and operational level (Marine Logistics Command)?

Response: I don't know how MDC will work on the West Coast, but I imagine that when it is in place that the Marine Logistics Command will have to revamp its operational model.

Question 11. Describe how MDC operations integrate with USTRANSCOM's principles of supporting the last tactical mile?

Response: The MDC provides using unit with the in transit visibility it needs in order base current combat operations off of incoming assets. They can now have the confidence in knowing that future supplies are inbound and determine future missions based off of knowing where their stuff is and when they are going to get it.

Question 12. List major differences and similarities of the MDC concepts of operations and compare against logistics support operations performed by the MLC during OIF.

Response: I don't know.

Question 13. What external agencies (CNA, MCLAT, II MEF, MARFORLANT, HQMC - I&L) are engaged in assisting, monitoring, improving and /or evaluating the MDC?

Response: Currently II MEF, MARFORLANT and HQMC have come to conduct command visits and conduct evaluations. I do not know the extent of which they have inspected.

Question 14. How does the MDC's distribution function using RFID technology to provide Intransit Visibility (ITV)?

Response: As soon as the gear enters our warehouse to be distributed, we write RFID tags to the shipment so that when the gear leaves our warehouse, we can see where it is en route to customer. The interrogator network allows us to see down to the NSN and quantity of that item on a convoy.

Question 15. Comment on how implementation of GCSS-MC will impact the MDC.

Response: I honestly do not know enough about GCSS-MC to be able to comment on its impact. However, it would be nice to see a computer program that is not a stovepipe system which allows us to track from the moment that the using unit presses the enter button on their computer. This way I could use passive tags to coordinate the tracking of an asset all the way from the manufacturer to the fighting hole.

Question 16. Are there plans to establish MDC's within the other FSSG's?

Response: I don't know, but I am willing to guess that if this one succeeds, you will see more MDC's standing up all over the Marine Corps, not just the MEF's, but also smaller base units like Quantico.

Question 17. Describe how the MDC impacts personnel requirements and operations at Camp Lejeune's TMO?

Response: Currently we are co located with TMO and are essentially completely integrated with them, but the difference between the civilians and the MDC is that we are deployable. While Marines have training requirements and are constantly moving around, the civilians provide that good remain behind presence in order to sustain operations in the rear.

Question 18. Describe the MDC's relationship with the ISSA and supported units from a customer support perspective.

Response: The SMU's customer service section and the MDC's Operations section have a good working relationship with each other. In case it is requisitioning question then it falls under the SMU, but if it is a shipping questions then it is answered by the MDC. This may sound awkward but there are two major points that must be identified. Firstly, transportation and inventory management must be kept separate. The second you start to integrate the two then it forms one monstrous organization and would be absorbed by the SMU. This is not what the logisticians need.

Question 19. Will the MDC coordinate aerial distribution and/or resupply?

Response: Currently we do not, but I can foresee that in the future.

Question 20. Describe the Table of Equipment (T/E) and Table of Organization (T/O) changes required for the MDC.

Response: There was no set T/O or T/E for the MDC, it was a Table of Organization Change Request (TOCR) taken from Beach and Terminal Operations (BTO), Company, 2d TSB; and augmented with personnel from PP&P section and Headquarters Company, 2d, Supply Battalion. The MDC needs a good mix of 3112's, 3052's, and 3051's. Then add some 3043's in order to be able to track requisition status and frustrated cargo. Additionally, Marines with Motor Transportation (35XX) and Logistics (04XX) MOS's are needed to arrange transportation and embarkation requirements.

Question 21. What personnel savings do you envisage the MDC will yield?

Response: First, it is already saving the Marine Corps lift requirements on a daily basis. Before MDC stood up, using units were forced to request at least one vehicle per day to pick up requisitioned items from the SMU and TMO, now the MDC provides all of II MEF with the gear they ordered using only ten MTVR's. Include all the time and manpower wasted in trying to arrange for each battalion to pick up gear from TMO and the SMU, and it adds up to quite a bit of savings.

Question 22. Comment on other significant issues related to MDC concepts and operations that will enhance logistics support.

Response: Passive tags and readers will allow us to see when the gear has hit our warehouse without having to take individually scan in every piece of gear. This would help eliminate the problem of human error. enhance logistics support.

APPENDIX B

DLA's VISION FOR LOGISTICS EXCELLENCE



DLA Tomorrow ... What We Are Going To Be

FY 03-09

Characteristics:

Light and Agile
Smaller Footprint
Information Intensive
Knowledge Based
Integrated Processes
Collaboration with Customers
Service Oriented
Proactive



Transformation Plan:

Business Systems
Modernization
Competitive Sourcing
Shift to Commercial
Practices
Customer Relationship
Management

REFERENCE LIST

- Beatty, Scott., 1stLt, USMC. 2005. Interviewed by Maj Kevin Scott, USMC, 25 February. MDC Interview Questionnaire, Camp Lejeune, North Carolina.
- Brown, Kenneth E. 1987. *Strategies: The Logistics-Strategy Link*. Washington, DC: National Defense University Press.
- Dell Computer Corporation. 2005. Article on-line. Available from <http://www.wowessays.com/dbase/ab1/iev114.shtml>. Internet. Accessed on 1 March 2005.
- Dickerson, Robert C., MajGen, USMC. 2004. Materiel Distribution Center Implementation Brief. Camp Lejeune, North Carolina.
- Edwards, John E., Maj. 1993. *Combat Service Support Guide*. Harrisburg, Pennsylvania. Stackpole Books.
- Engels, Donald W. 1980. *Alexander the Great and the Logistics of the Macedonian Army*. California: University of California Press.
- Falk, Stanley L. 1986. *George C. Thorpe's Pure Logistics*. Washington, DC: NDU Press Edition.
- Garner, Jacques. 1998. Higher Performance at Lower Cost: Transforming DoD Logistics. Article on-line. Available from <http://www.acq.osd.mil/ousda/speech/carlisle.html>. Internet. Accessed on 29 October 2004.
- Gates II, William H. 1999. *Business at the Speed of Thought Using a Digital Nervous System*. New York. Warner Books.
- Gray, Alfred M., General (Retired), 29th Commandant, USMC. 1997. Quoted in MCDP 4, *Logistics*. Washington, DC: Headquarters, USMC.
- Hammer, Michael, and James Champy. 1993. *Reengineering the Corporation*. New York: HarperCollins Publishers, Inc.
- Kelly, Richard L., LtGen, USMC. 2003. Supply Chain Council Award for Excellence in Supply Chain Operations. Washington, DC: Headquarters, USMC.
- Lehnert, Michael R., BGen, USMC, Former Commanding General, MLC and 2d FSSG. 2004. Quoted by Baldwin, Charles P. in *Logistics Spectrum*. Article titled, Marines Move Forward from the Sea to Baghdad. Published January-March 2004.

- Lepson, Michael. Maj, USMC. 2005. Materiel Distribution Center Recommendation for Supply Chain Council Operational Excellence Award. Camp Lejeune, North Carolina.
- Love, Robert E., Col, (Retired), USMC. 2002. Marine Corps Logistics Enterprise Integration Presentation. Washington, DC: Integrated Logistics Capability, Headquarters, USMC.
- Marine Logistics Command. 2003. Presentation to General Hagee. Camp LSA Fox, Kuwait.
- Martin, James B., LTC, (Retired), US Army. 1995. *Logistics: Desert Storm and Into the 21st Century*. Kansas: DLRO, US Army Command and General Staff College, Fort Leavenworth, Kansas.
- McKissock, Gary S., LtGen (Retired), Former Deputy Commandant, Installations and Logistics, USMC. 2001. Quoted in System Realignment and Categorization / Consolidation Project. Washington, DC. Headquarters, USMC.
- Neal, Richard I., Gen, (Retired), USMC. 2004. The Case for Logistics Modernization. *Marine Corps Gazette*, August 2004.
- Office of the Under Secretary of Defense for Acquisition and Technology. 1996. *Defense Science Task Force Report on Logistics Modernization*. Washington, DC.
- O'Neil, Katherine L., 1stLt, USMC. 2005. Technology Drives Logistic Further. Article on-line. Available from <http://www.usmc.mil/marinelink/mcn2000.nsf/frontpage/news/>. Internet. Accessed on 25 March 2005.
- Pennington, Steve., Maj, USMC. 2003. MCLAT Analysis of Class IX Distribution during Operation Iraqi Freedom. Camp Lejeune, North Carolina.
- Ross, Scott D., LTC, US Army. 2003. USTRANSCOM is DOD's Distribution Process Owner Why and what does it mean?. Scott Air Force Base, Illinois. USTRANCOM Public Release Number: 031124-1.
- Scott, Kevin R., Maj, USMC. 2002. Operational Architecture Presentation to 6th Marines Regiment. Camp Lejeune, North Carolina.
- So, Adrienne. 2002. Wal-Mart Earns Top Spot on Fortune 500 List. Article on-line. Available from <http://www.cavalierdaily.com/CVArticle.asp?ID=12228&pid=864.html>. Internet. Accessed on 15 April 2005.
- Trimble, Vince H. 1990. *Sam Walton: The Inside Story of America's Richest Man*. New York: Penguin Books, USA, Inc.

- United States Marine Corps. 2004. ALMAR 006/04. Logistics Modernization. Washington, DC: Headquarters, USMC.
- _____. MCDP 4, *Logistics*. 1997. Washington, DC: Headquarters, USMC.
- _____. MCWP 4-1, *Logistics Operations*. 1999. Washington, DC: Headquarters, USMC.
- _____. MCWP 4-11.3. *Transportation Operations*. 2001. Washington, DC: Headquarters, USMC.
- _____. MCWP 4-11.7. *MAGTF Supply Operations*. 1996. Washington, DC: Headquarters, USMC.
- _____. Message 242033Z FEB 05. 2005. Logistics Modernization: Realignment and Renaming the FSSG. Washington, DC: Headquarters, USMC.
- Wal-Mart Stores, Incorporated. 2005. Wal-Mart Distribution Center. Article on-line. Available at <http://www.Wal-Martfacts.com/wal-mart-distribution-centers.aspx>. Internet. Accessed on 1 February 2005.
- _____. Wal-Mart Fact Sheet. 2005. Article on-line. Available at <http://www.Wal-Martfacts.com/doyouknow/>. Internet. Accessed on 15 April 2005.
- Wang, Mark Y. 2000. *Accelerated Logistics, Streamlining the Army's Supply Chain*. California: Rand.

INITIAL DISTRIBUTION LIST

Combined Arms Research Library
U.S. Army Command and General Staff College
250 Gibbon Ave.
Fort Leavenworth, KS 66027-2314

Defense Technical Information Center/OCA
825 John J. Kingman Rd., Suite 944
Fort Belvoir, VA 22060-6218

Mr. Willis Jackson
DLRO
USACGSC
1 Reynolds Ave.
Fort Leavenworth, KS 66027-1352

Dr. James Martin
DLRO
USACGSC
1 Reynolds Ave.
Fort Leavenworth, KS 66027-1352

Mr. Mike Weaver
DLRO
USACGSC
1 Reynolds Ave.
Fort Leavenworth, KS 66027-1352

Officer in Charge
LOGMOD Team East
Marine Corps Combat Service Support Schools
PSC Box 20041
Camp Lejeune, NC 28542-0041

CERTIFICATION FOR MMAS DISTRIBUTION STATEMENT

1. Certification Date: 17 June 2005
2. Thesis Author: Major Kevin R. Scott, USMC
3. Thesis Title: Logistics Modernization in the United States Marine Corps: Materiel Distribution Center

4. Thesis Committee Members: _____

Signatures: _____

5. Distribution Statement: See distribution statements A-X on reverse, then circle appropriate distribution statement letter code below:

☒ A B C D E F X SEE EXPLANATION OF CODES ON REVERSE

If your thesis does not fit into any of the above categories or is classified, you must coordinate with the classified section at CARL.

6. Justification: Justification is required for any distribution other than described in Distribution Statement A. All or part of a thesis may justify distribution limitation. See limitation justification statements 1-10 on reverse, then list, below; the statement(s) that applies (apply) to your thesis and corresponding chapters/sections and pages. Follow sample format shown below:

EXAMPLE

<u>Limitation Justification Statement</u>	/	<u>Chapter/Section</u>	/	<u>Page(s)</u>
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____

Fill in limitation justification for your thesis below:

<u>Limitation Justification Statement</u>	/	<u>Chapter/Section</u>	/	<u>Page(s)</u>
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____

7. MMAS Thesis Author's Signature: _____

STATEMENT A: Approved for public release; distribution is unlimited. (Documents with this statement may be made available or sold to the general public and foreign nationals).

STATEMENT B: Distribution authorized to U.S. Government agencies only (insert reason and date ON REVERSE OF THIS FORM). Currently used reasons for imposing this statement include the following:

1. Foreign Government Information. Protection of foreign information.
2. Proprietary Information. Protection of proprietary information not owned by the U.S. Government.
3. Critical Technology. Protection and control of critical technology including technical data with potential military application.
4. Test and Evaluation. Protection of test and evaluation of commercial production or military hardware.
5. Contractor Performance Evaluation. Protection of information involving contractor performance evaluation.
6. Premature Dissemination. Protection of information involving systems or hardware from premature dissemination.
7. Administrative/Operational Use. Protection of information restricted to official use or for administrative or operational purposes.
8. Software Documentation. Protection of software documentation - release only in accordance with the provisions of DoD Instruction 7930.2.
9. Specific Authority. Protection of information required by a specific authority.
10. Direct Military Support. To protect export-controlled technical data of such military significance that release for purposes other than direct support of DoD-approved activities may jeopardize a U.S. military advantage.

STATEMENT C: Distribution authorized to U.S. Government agencies and their contractors: (REASON AND DATE). Currently most used reasons are 1, 3, 7, 8, and 9 above.

STATEMENT D: Distribution authorized to DoD and U.S. DoD contractors only; (REASON AND DATE). Currently most reasons are 1, 3, 7, 8, and 9 above.

STATEMENT E: Distribution authorized to DoD only; (REASON AND DATE). Currently most used reasons are 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.

STATEMENT F: Further dissemination only as directed by (controlling DoD office and date), or higher DoD authority. Used when the DoD originator determines that information is subject to special dissemination limitation specified by paragraph 4-505, DoD 5200.1-R.

STATEMENT X: Distribution authorized to U.S. Government agencies and private individuals of enterprises eligible to obtain export-controlled technical data in accordance with DoD Directive 5230.25; (date).